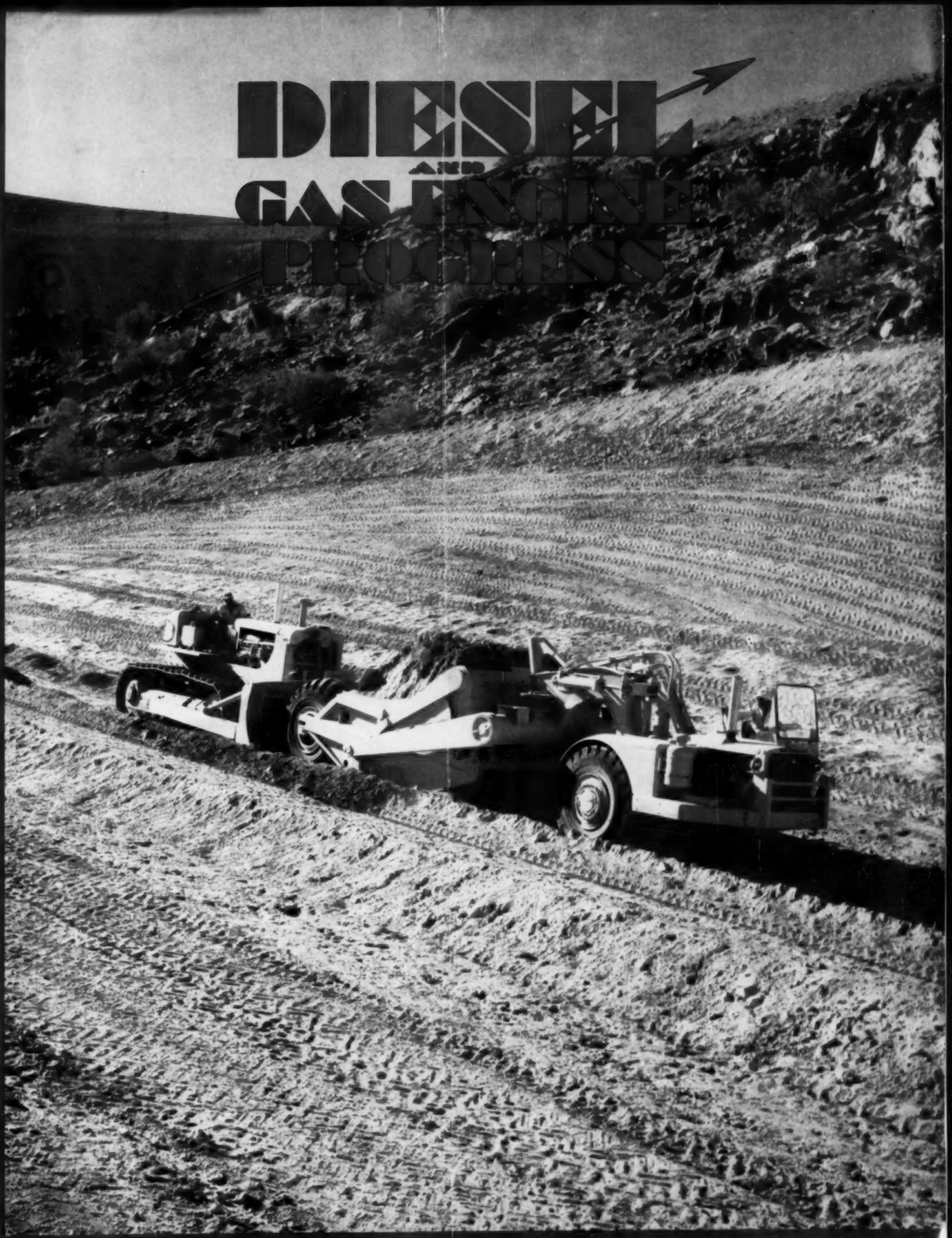
DIESEL AND GAS ENGINE PROGRESS

DIESEL ENGINES • DUAL FUEL ENGINES • NATURAL GAS ENGINES • GAS TURBINES



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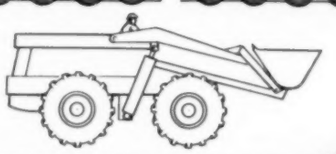
only the

HYDRA-DRIVES® BDB

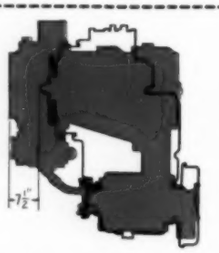
OFFERS ALL THESE MAJOR ADVANTAGES

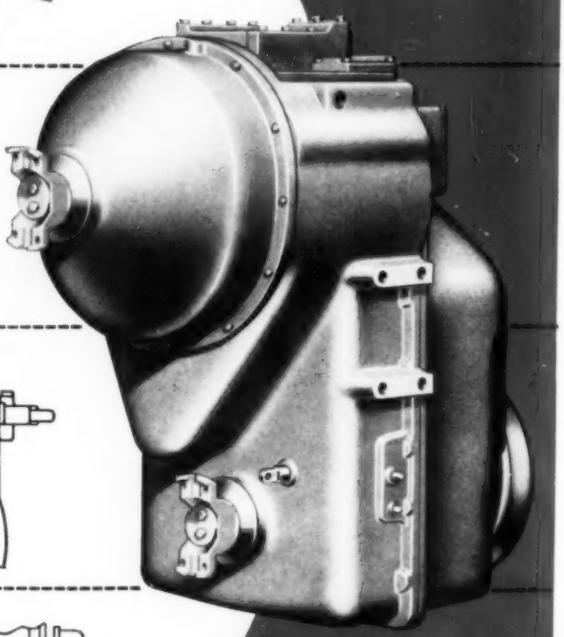
IN FULL-POWER SHIFT TRANSMISSIONS for equipment from 60 to 175 h.p.

1. **4 speeds forward and reverse.** All power shifted! Provides maximum horsepower to load under all load conditions.

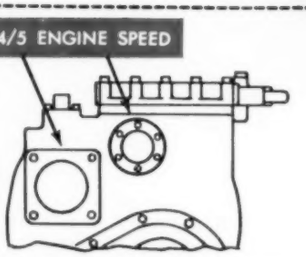


2. **Integral design.** Torque converter, transmission, oil passages, valving and oil sump are in *one* compact housing—7½" shorter than comparable models.

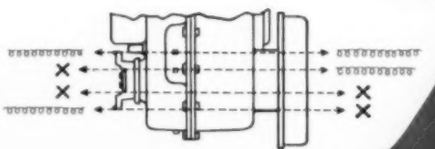




3. **Dual reduced speed pump drives.** Pumps can be driven at engine speed or 4/5 engine speed for longer life and increased horsepower to pump load. Single pump drive is also available.



4. **Full disconnect** provides four combinations of split drive . . . from torque on both shafts, to both shafts in disconnect.



SPECIALLY DESIGNED FOR SMALLER INSTALLATIONS

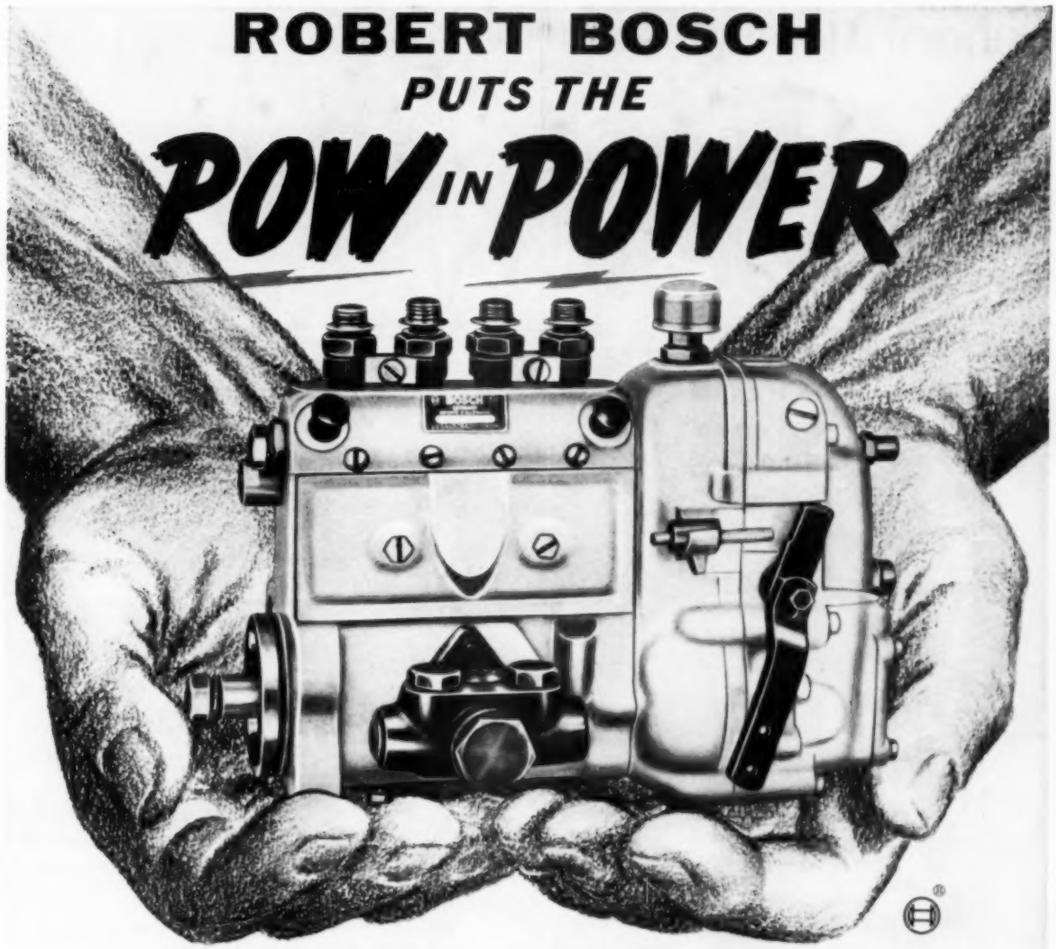
Rockwell-Standard's new model Hydra-Drives Full Power Shift Transmission is now available in sizes especially designed for smaller installations, such as front end loaders, fork trucks, scrapers, crane carriers, rubber tire tractors and military vehicles.

In addition, the Hydra-Drives BDB offers easier servicing and maintenance. There are fewer moving parts and bearings. The simple, rugged countershaft design and spur gears simplify maintenance.

HYDRA DRIVES

ROCKWELL-STANDARD CORPORATION
TRANSMISSION AND AXLE DIVISION
DETROIT 32, MICHIGAN

ROBERT BOSCH
PUTS THE
POW IN POWER



— in the world's finest Fuel Injection Equipment

ROBERT BOSCH means fuel injection equipment made to the closest tolerances. It means over 30 years of experience by the designers of the fuel injection equipment which made the high speed diesel engine practicable. It means fuel injection equipment of consistently higher quality at lower price... most complete line of nozzles... world-wide service. Leading engine makers here and abroad use ROBERT BOSCH as original equipment.

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40-25 Crescent St., Long Island City 1, N.Y. • 225 Seventh Street, San Francisco 3, Calif.

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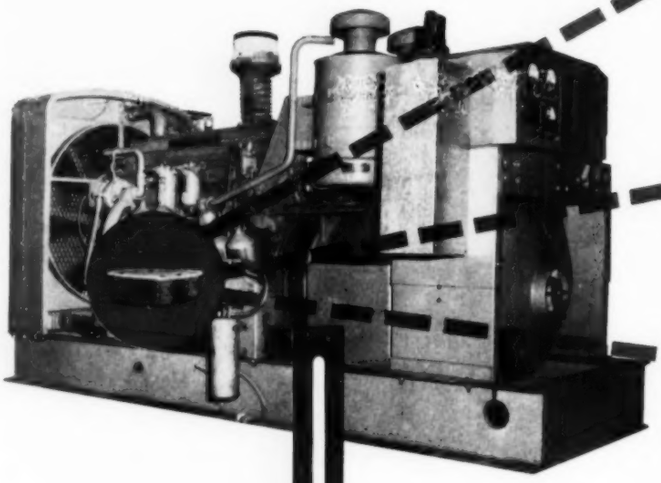
General Motors Reliability in Action...

Stand-by When Power's in Peril!

HOSPITALIZATION demands minute-to-minute readiness for emergencies!



COMMUNICATION calls for the 24-hour-a-day relay of items of information!

PRESERVATION of frozen foods requires around-the-clock temperature control!

Harrison Heat Exchangers —Reliable Products of General Motors Research and Engineering.

Harrison-Cooled GM Diesels Drive Generators for Power When Main Lines Fail!

A storm hurtles in from the sea . . . power lines are down . . . transformers are blown! Emergencies must be met . . . and they are met with reliable stand-by equipment. GM Diesel-driven generators pour out the power to preserve the vitality of a community! And Harrison heat exchangers cool the engine oil on this reliable generating equipment. Harrison—with a half century of experience in the heat-control field—assures you of top-quality products that are researched and engineered to control vital temperatures with maximum efficiency. The most advanced industrial, aviation and marine equipment relies on Harrison heat exchangers. If you have a cooling problem, look to the leader . . . rely on Harrison for the answer!

GM HARRISON

TEMPERATURES MADE TO ORDER

AIRCRAFT, AUTOMOTIVE, MARINE AND INDUSTRIAL HEAT EXCHANGERS

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

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FRONT COVER ILLUSTRATION

The new Caterpillar No. 9 tractor—No. 442 of its type—was tested on a variety of jobs before market-availability. Shown loaded by a Cat 988 series H tractor, a prototype is tested at Caterpillar's Phoenix proving grounds.

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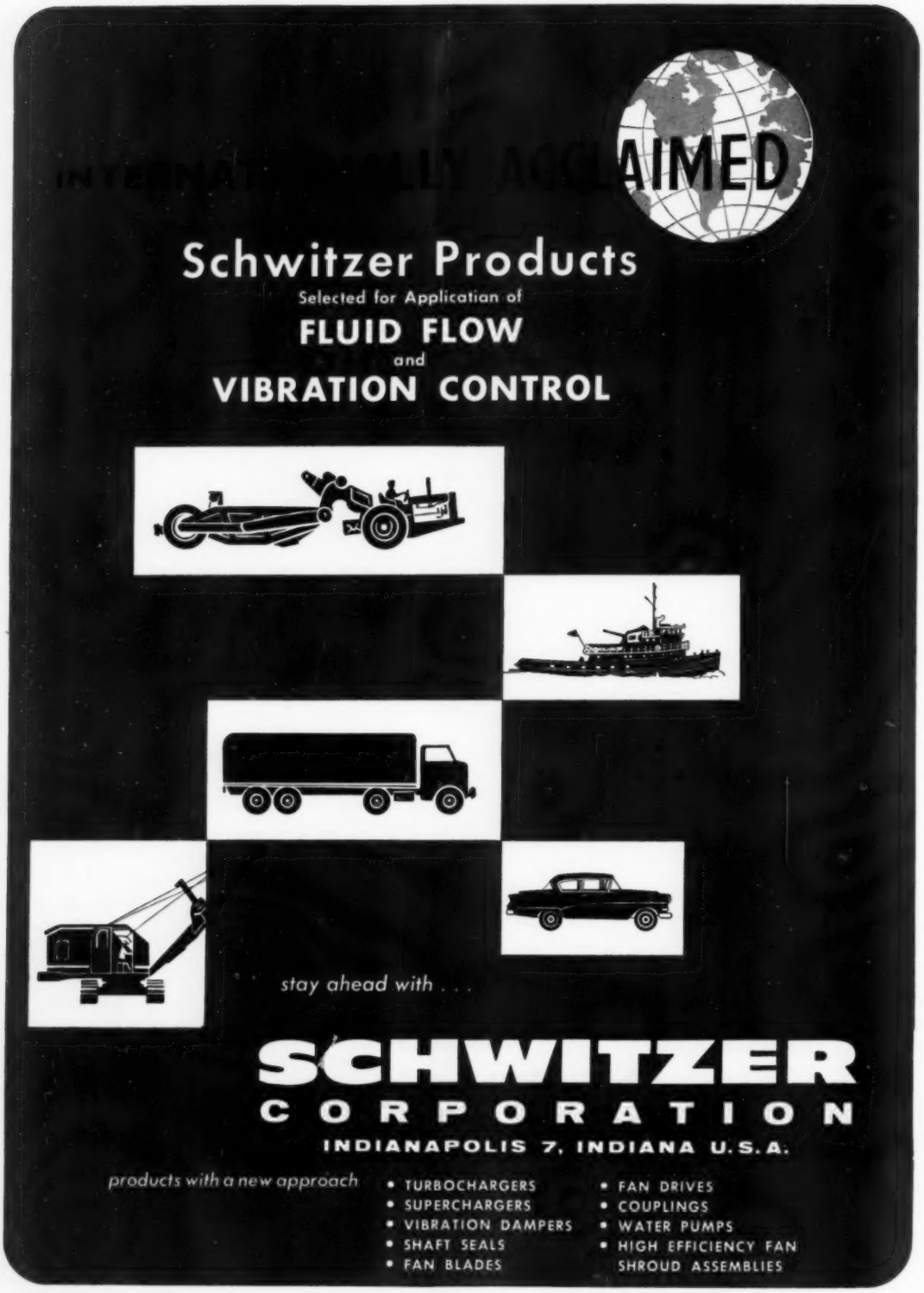
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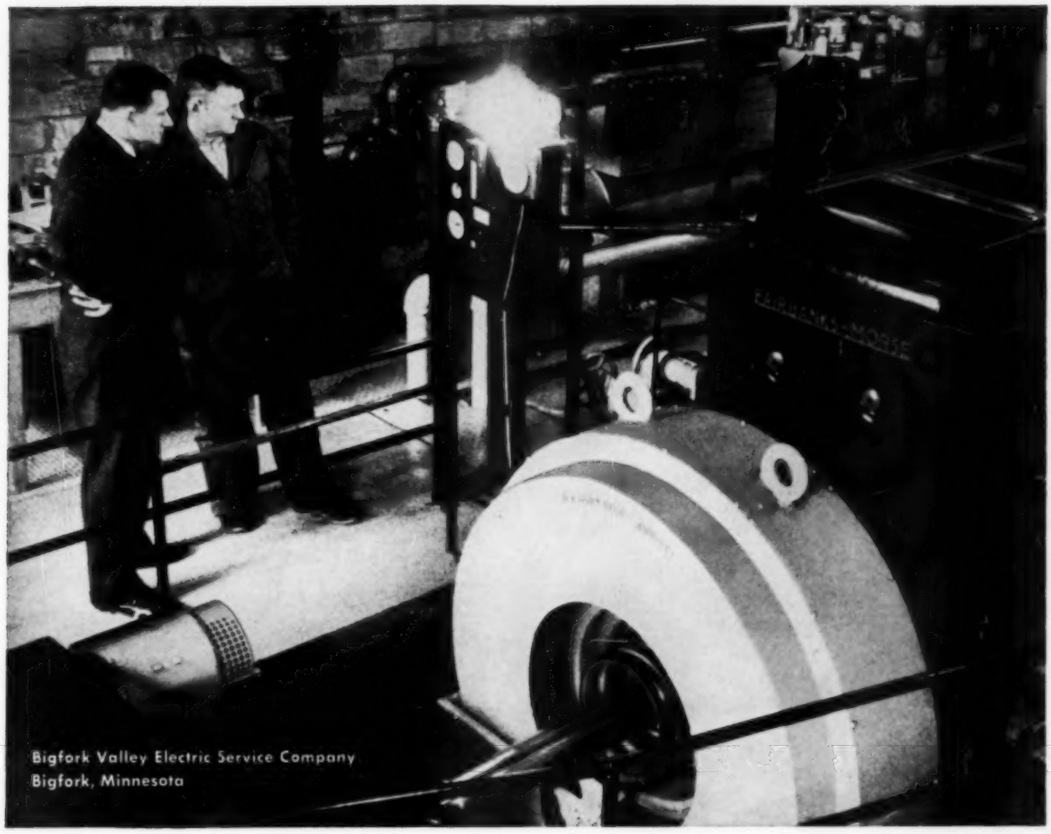


Bigfork Valley Electric Service Company
Bigfork, Minnesota

1/2 HOUR DOWN-TIME IN 6 YEARS WITH CITIES SERVICE LUBE OIL

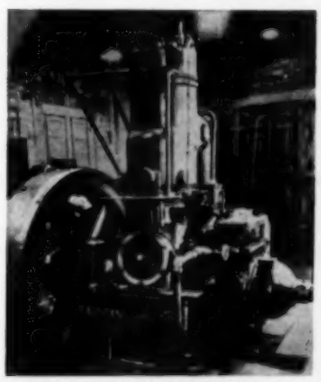
This 300 KW generator supplies a major portion of the Bigfork power supply. Nearby is one of Minnesota's largest lumber mills which, during the cutting season, saws three to four million board feet of white pine. During this season the power plant operates at peak load and can ill afford down-time on a major piece of equipment.

For this reason, Bigfork relies on Cities Service DC-500 Lube Oil. Orbin Holt, of Bigfork Valley Electric Service Company states, "Cities Service has given us excellent technical advice on our lubrication practices, and we couldn't ask for better results than we have received with DC-500 oil. We have had only ½ hour down-time on this generator in six years and that wasn't a lubrication failure."

Cities Service DC-500 with its high level of detergency-dispersion and great anti-oxidation and anti-corrosion properties is typical of the complete line of diesel lubricants available for every type of service and all types of equipment. Expert technical assistance is at your call with experienced Cities Service Lubrication Engineers. Call the nearest office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Ancient one-cylinder generator was installed in 1929 and is still called on for its 35 KW output during peak loads. Careful maintenance and quality lubricants are credited for its long life.

new from Chrysler

CUTAWAY:
Model A 6 L 514
Other models: 9 to 300 hp

DEUTZ Air-Cooled Diesel Engines

CHRYSLER CHOSE DEUTZ after a two year investigation of the diesel engine field—culminating in a three month, on-the-spot study by Chrysler engineers of Deutz facilities and applications in Germany. Here's what they found:

1. **AIR COOLING** offers many advantages for a number of industrial applications. It eliminates a bulky radiator and all liquid coolant problems at the outset.
2. **DURABILITY.** Deutz engines have proved their exceptional durability in hundreds of thousands of applications operating in temperatures from +140° to −40°. It is common for Deutz engines to operate 10,000 hours with only routine maintenance—14,000 hours is not unusual.
3. **MANUFACTURING FACILITIES.** The Deutz plants have been completely rebuilt since World War II and the most modern equipment and machine tools installed.
4. **INTERCHANGEABILITY OF PARTS.** Deutz engines have an extremely high degree of parts interchangeability from model to model. This reduces parts inventories to a minimum.

SERVICE NETWORK

Chrysler's nationwide network of engine centers and dealers provides parts and service for Deutz Diesels anywhere in the United States within 8 hours.

WHAT ARE THE ADVANTAGES OF DIRECT AIR COOLING?

Almost all industrial engines, to be strictly accurate, are cooled by air—either directly or indirectly. An indirect air cooling system (the so-called liquid cooled engine) uses water simply to transfer engine heat to the radiator where it is dissipated by air. Direct air cooling—which by-passes the intermediate step (water)—has many advantages:

1. **SIMPLE AND COMPACT.** No bulky radiator, pump, hoses.
2. **RAPID WARM UP.** No large volume of cooling water to be heated. Deutz engines deliver full power within 30 seconds to one minute after full start.
3. **SIMPLE MAINTENANCE.** No possibility of corrosion or freezing. No possibility of water leakage into cylinders and crankcase. No water availability problems in arid areas.
4. **PROLONGED ENGINE LIFE.** High cylinder wall temperatures reduce chemical corrosion and this in turn, reduces cylinder wear.

CYLINDER CUTAWAY:
Series FL 712

WRITE FOR INFORMATION AND SPECIFICATIONS:

DIESEL ENGINE SALES
MARINE AND INDUSTRIAL ENGINE DIVISION
CHRYSLER CORPORATION
DETROIT 31, MICHIGAN

Please send me information and specifications on the Deutz air-cooled Diesels—9 to 300 hp.

Name_____

Company_____

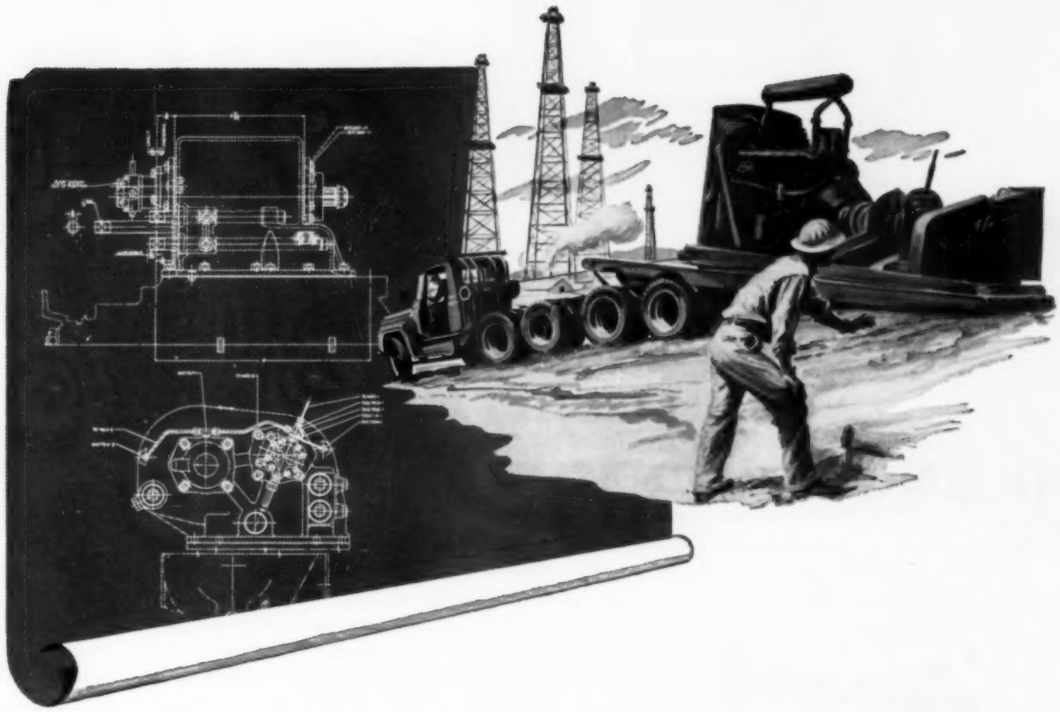
Address_____

Application_____

City_____ Zone____ State_____

CHRYSLER
MARINE AND INDUSTRIAL ENGINE DIVISION
CHRYSLER CORPORATION • DETROIT 31, MICHIGAN

NEW SPICER PTO HAS GREATER CAPACITY FOR HEAVY DUTY WORK



● Rugged, round-the-clock service, where full engine torque is a "must", calls for a top-mounted PTO with the capacity to transmit that torque constantly and smoothly. Whether the vehicle is an oil field rig, a cement mixer truck, or a sand and gravel dump, the job can be done at highest operating efficiency with a Spicer forced-feed, top-mounted power take-off.

The Spicer top-mounted PTO—with either a Spicer 8031 or 8341 auxiliary transmission—outlasts conventional PTO's because positive lubrication is assured at all times, regardless of the operating angle of the vehicle. An oil pump provides forced-feed lubrication at slow speeds with full engine torque.

Spicer top-mounted power take-offs transmit the full torque of the engine with forward transmission in direct drive, or loads equivalent to engine torque with forward transmission in gear, to operate air compressors, heavy duty winches, large pumps and other equipment. Two speeds forward, one speed reverse.

Where definite torque rating of the Spicer PTO is desired, Dana engineers will gladly submit this information upon receipt of complete data on the installation and type of operation.

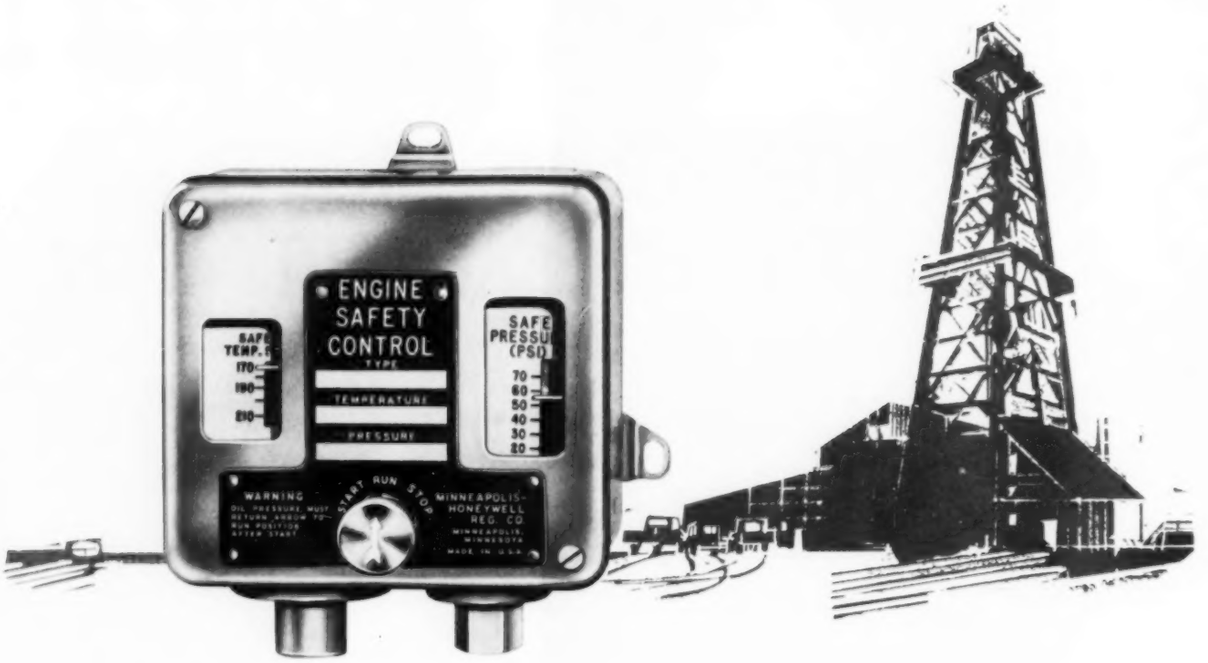
For further information write Dana Corporation, Toledo 1, Ohio.

DANA Spicer **DANA CORPORATION**

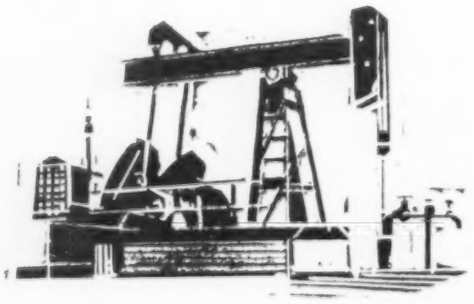
Toledo 1, Ohio

SERVING TRANSPORTATION — Transmissions • Auxiliaries Universal Joints • Clutches • Propeller Shafts • Power Take-Offs Torque Converters • Axles • Powr-Lok Differentials • Gear Boxes • Forgings • Stampings • Frames • Railway Drives

Many of these products are manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario



ELIMINATE OIL PRESSURE AND ENGINE TEMPERATURE DAMAGE



Protect your investment with Honeywell's fail-safe controller ... especially vital for unattended engines. Why risk severely damaging *even one* engine because of over-heating or loss of oil pressure? By installing Honeywell's combination engine safety control, you'll help put a stop to costly repair bills and downtime. It's better than having an operator there to stop an engine or sound an alarm when trouble starts.

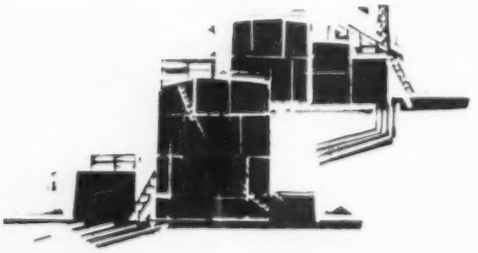
Honeywell's P618 engine safety control will never fail you. Temperature and pressure settings won't drift off set points because this is an *industrial* instrument for *industrial* applications with heavy-duty construction that is vibration-resistant. The patented fail-safe feature always assures a shutdown even if the bulb or capillary is damaged. Large "picture" windows and calibrated dial keep settings easily visible without removing cover. New and different, there's nothing like it!

For complete information, contact your local Honeywell office or write: Minneapolis-Honeywell, Dept. DP-1-21, Minneapolis 8, Minn.

Honeywell

First in Control

SINCE 1885



SLUDGE *situation gets a clean-up*

STANODIESEL Oil M helps keep diesels clean and running smoothly at Princeton, Missouri

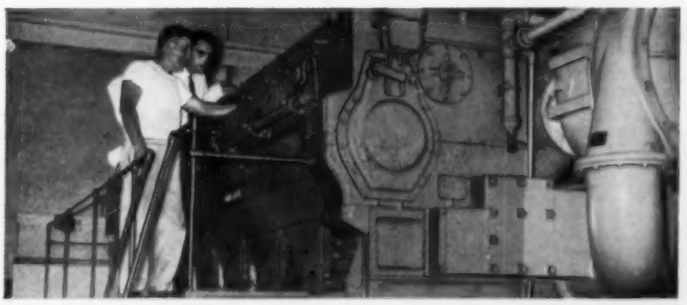
The situation: Consumer Public Service Company, Princeton, Missouri, has three diesels in service—a 225 hp unit installed in 1951, a 1,083 hp unit installed in 1954 and a 1,440 hp unit installed in 1956. In previous equipment, sludging had been a problem, so when these units went into service, a heavy duty oil was recommended—STANODIESEL Oil M.

What has happened: The oil has been inspected regularly by a Standard Oil lubrication specialist. Samples are periodically removed for analysis at Standard's Whiting Indiana research laboratory. Analysis shows the oil to be in excellent condition. Since the 1,440 hp unit was started up in 1956, it has generated 1,672,200 kw hours of electricity.

What you can do: Find out more about how STANODIESEL Oil M can deliver service in your plant. Ask for more information from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

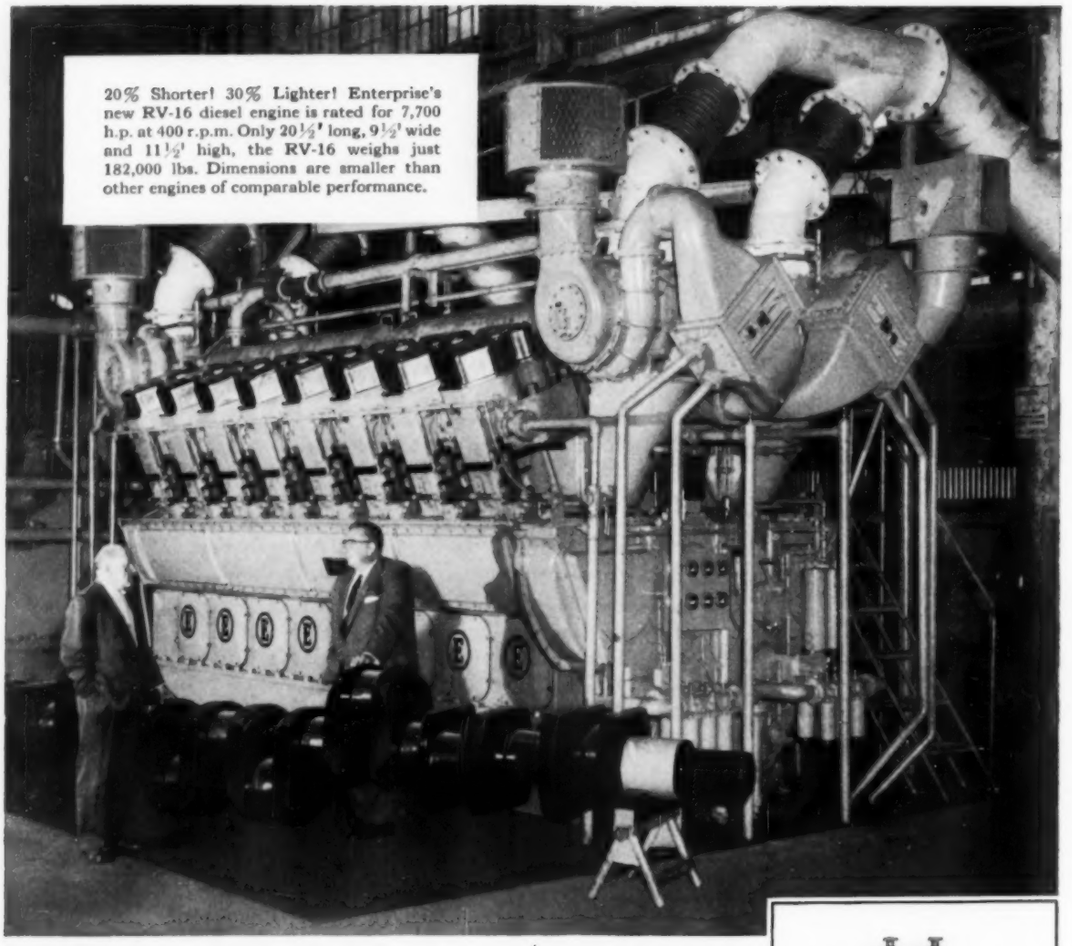
Quick facts about STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.



Darrel McCormick, Standard Oil lubrication specialist and William Rutledge, plant superintendent, inspect 1,440 hp diesel in Princeton, Missouri plant. Darrel is an experienced hand at this work. He has an engineering degree from Vanderbilt University plus four years' experience in industrial lubrication work at Standard Oil. He has also completed the Standard Oil Sales Engineering School.

You expect more from STANDARD *and you get it!*



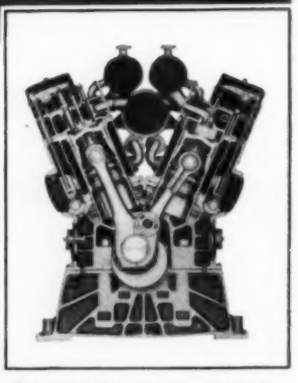
20% Shorter! 30% Lighter! Enterprise's new RV-16 diesel engine is rated for 7,700 h.p. at 400 r.p.m. Only 20½' long, 9½' wide and 11½' high, the RV-16 weighs just 182,000 lbs. Dimensions are smaller than other engines of comparable performance.

Enterprise Chooses KOPPERS Piston Rings Exclusively for RV-16

Prototype of a new line of industrial diesel engines, the RV-16, built by Enterprise Engine & Machinery Co., of San Francisco, is designed for such rugged operations as delivering main propulsion in towboats and seagoing freighters, or supplying power for pumping stations or electric generation.

As many other leading manufacturers have done, Enterprise has selected Koppers Piston Rings exclusively. Koppers wide range of types and sizes . . . variety of material selection . . . control of material quality . . . close tolerance performance . . . rigid standards of inspection—all contribute to Koppers leadership in the field of industrial piston and sealing rings, making Koppers the most dependable source of supply.

If you have a problem of ring application, avoid further needless expense. Take advantage of Koppers experience, research facilities and craftsmanship. Write for information today. KOPPERS COMPANY, INC., Piston Ring and Seal Department, 4201 Hamburg Street, Baltimore 3, Maryland.



Cutaway shows internal design of the RV-16

KOPPERS

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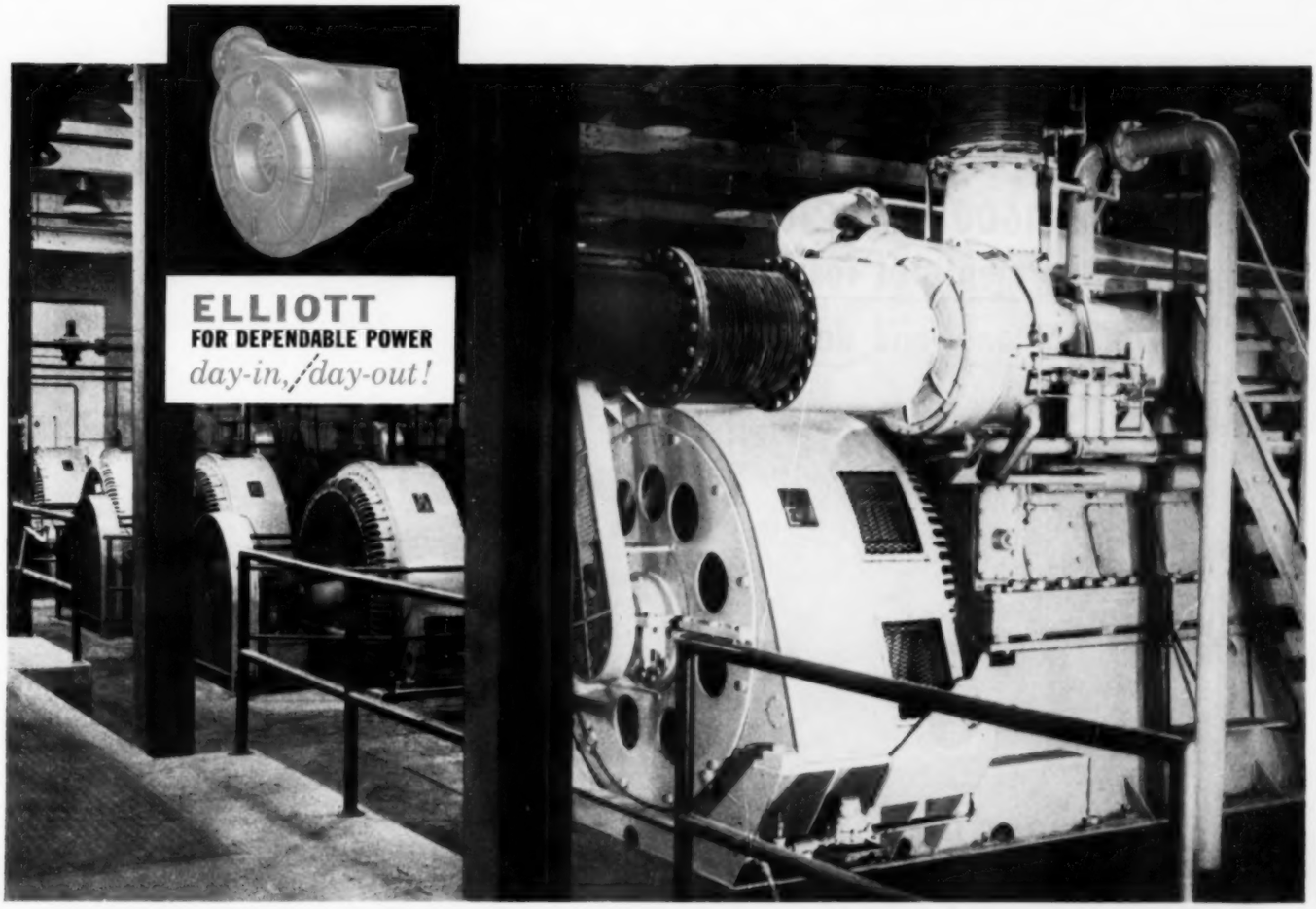
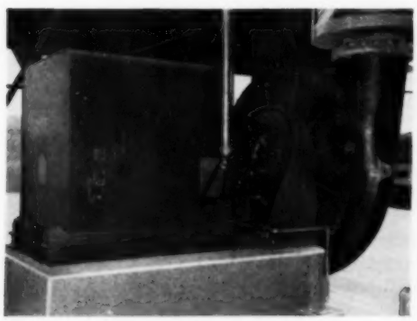
Industrial Piston Rings
Engineered Products Sold with **Service**



Elliott-turbocharged engines drive Elliott generators

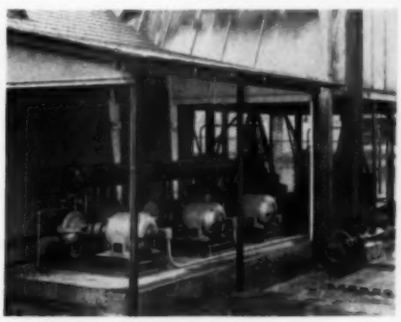
The five Elliott diesel-driven generators in this plant illustrate both high-speed and low-speed designs. In the foreground is a 1500-kw, 720-rpm generator. In the background are four 1233-kw, 327-rpm generators. Elliott generators—featuring FABRI-STEEL construction—are individually designed to the requirements of the engines, which are served by Elliott turbochargers.

Elliott turbochargers are stepping up the capabilities of over 16-million horsepower of diesel engines, both 4-cycle and 2-cycle, 175 hp and up.



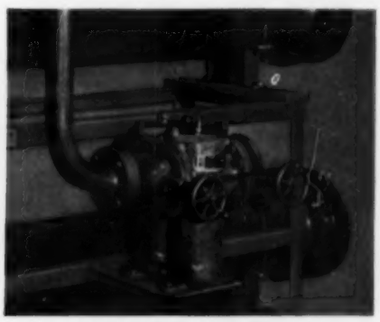
Elliott Scavenging Compressors

Elliott's rugged, single-stage scavenging compressors, direct-connected or geared to Elliott motors, are custom-built units to meet user requirements in capacity and pressure.



Elliott Crocker-Wheeler Motors

Excellent for pump drives and other uses in and around diesel plants. These three 10-hp, 750-rpm Elliott C-W motors are driving water cooling circulator pumps.



Also... Elliott Twin Strainers

For lube and fuel oil or water straining, Elliott Twin Strainers assure uninterrupted service. While one strainer basket is in service, the other is being cleaned.

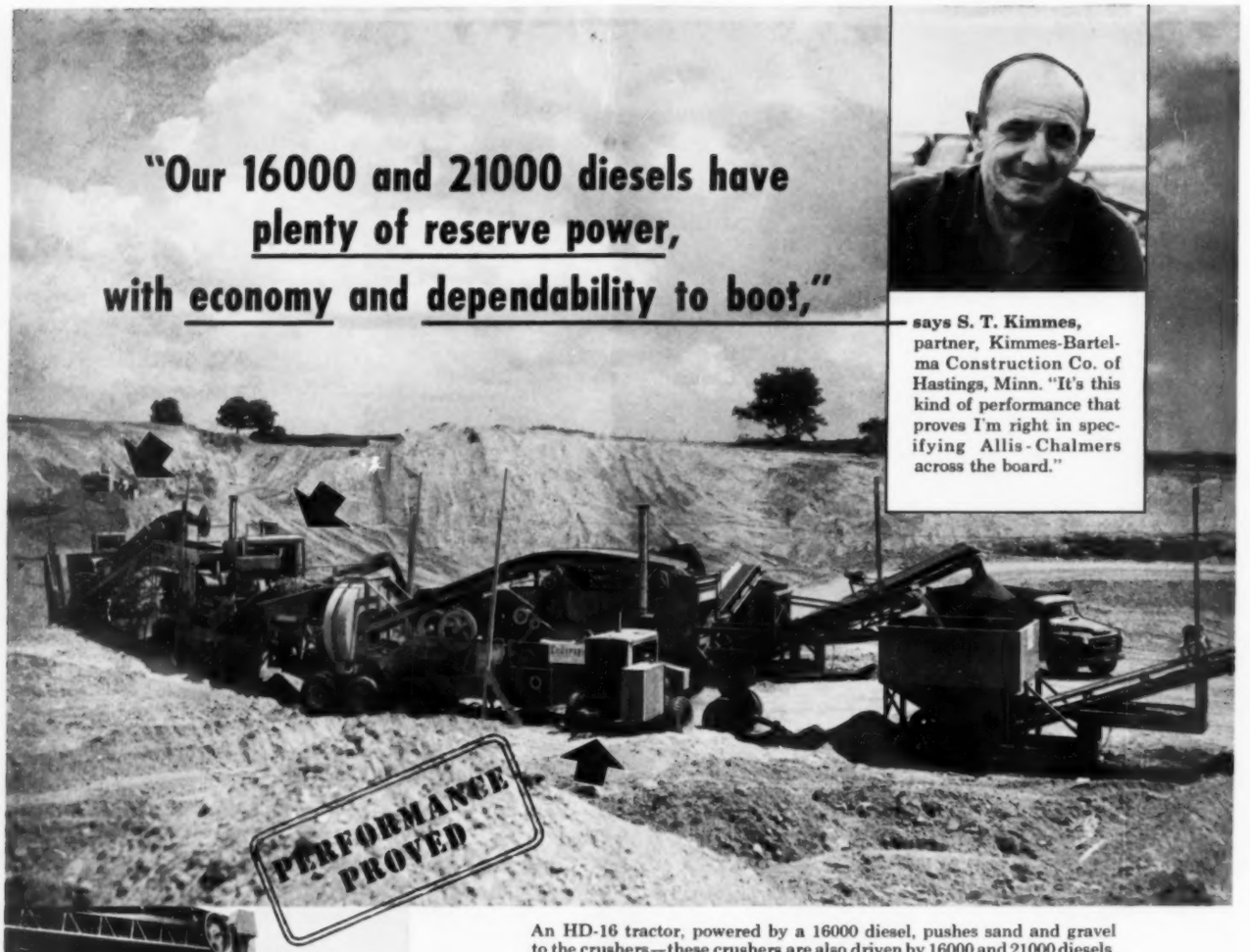
ELLIOTT Company JEANNETTE, PA.

DISTRIBUTORS IN PRINCIPAL CITIES

Q9-4

"Our 16000 and 21000 diesels have plenty of reserve power, with economy and dependability to boot,"

says S. T. Kimmes, partner, Kimmes-Bartelma Construction Co. of Hastings, Minn. "It's this kind of performance that proves I'm right in specifying Allis-Chalmers across the board."



An HD-16 tractor, powered by a 16000 diesel, pushes sand and gravel to the crushers—these crushers are also driven by 16000 and 21000 diesels.

A 16000 diesel powers this hopper at the pug mill.

21000 — 340 hp
(turbocharged)
16000 — 230 hp

Supplying and placing more than a million tons of subbase material for runways at a new midwestern Air Force base is typical of the jobs handled by the Kimmes-Bartelma Construction Co., Hastings, Minnesota.

Kimmes' aggregate plant shown above turned out 8,000 tons per day. These Allis-Chalmers 16000 and 21000 engines logged over 1,500 hours in three months. The only downtime on this job was due to wet weather.

Why is Kimmes' operation Allis-Chalmers-powered all the way? Because as he puts it: "These engines are in there giving us real performance day in and day out with no strain — in the tractors, on the crushers, and at the pug mill." They deliver the power and torque they are supposed to without overworking. The completely new Allis-Chalmers open-chamber combustion system makes the 16000 and 21000 the most economical, cleanest-running, fastest-starting diesels in their class.

Let your Allis-Chalmers dealer tell you more. Let him refer you to users — find out what they think of these "Performance-Proved" engines. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

8C-23

Why you need AiResearch turbocharger control systems

The two components of the AiResearch turbocharger control system are a speed sensor and an exhaust by-pass valve. They control the speed of exhaust-driven turbochargers by modulating the amount of engine exhaust used.

The AiResearch turbocharger control system delivers more air to the turbocharged engine automatically when needed. This more than doubles the torque rise and gives the engine much greater lugging ability under heavy loads.

AiResearch is the leader in the development and production of turbocharger controls for all major diesel engine applications as well as air-cooled turbochargers for diesel engines from 50 to 700 H.P. Your inquiries are invited.

Reduced fuel consumption

•

Smoking eliminated

•

Longer engine life

•

Lower maintenance costs

•

Shorter running time

•

Better engine lugging

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

UDT-817 power crushes 300 cu. yd. of 1¾-in. minus caleche rock hourly

This is a Texas-sized crushing job—300 cu. yd. of caleche crushed to 1¾-in. minus size hourly—and the new 6-cylinder turbocharged International UDT-817 diesel does it with power to spare.

The West Texas Construction Co., Lubbock, is crushing 20,000 yd. of caleche for road base material at this pit near Perryton for a 5-mile state road improvement contract. The big new International UDT-817 power unit is delivering only 265 cont. hp. @ 1800 rpm. on the Universal impact crusher with production being limited only by feeder capacity. About 85% of the caleche requires crushing.

Other International power on the job includes a UD-18A diesel on the Jaeger 315 air compressor operating the wagon drill boring dynamite holes and a carbureted U-264 engine on the Universal feeder.

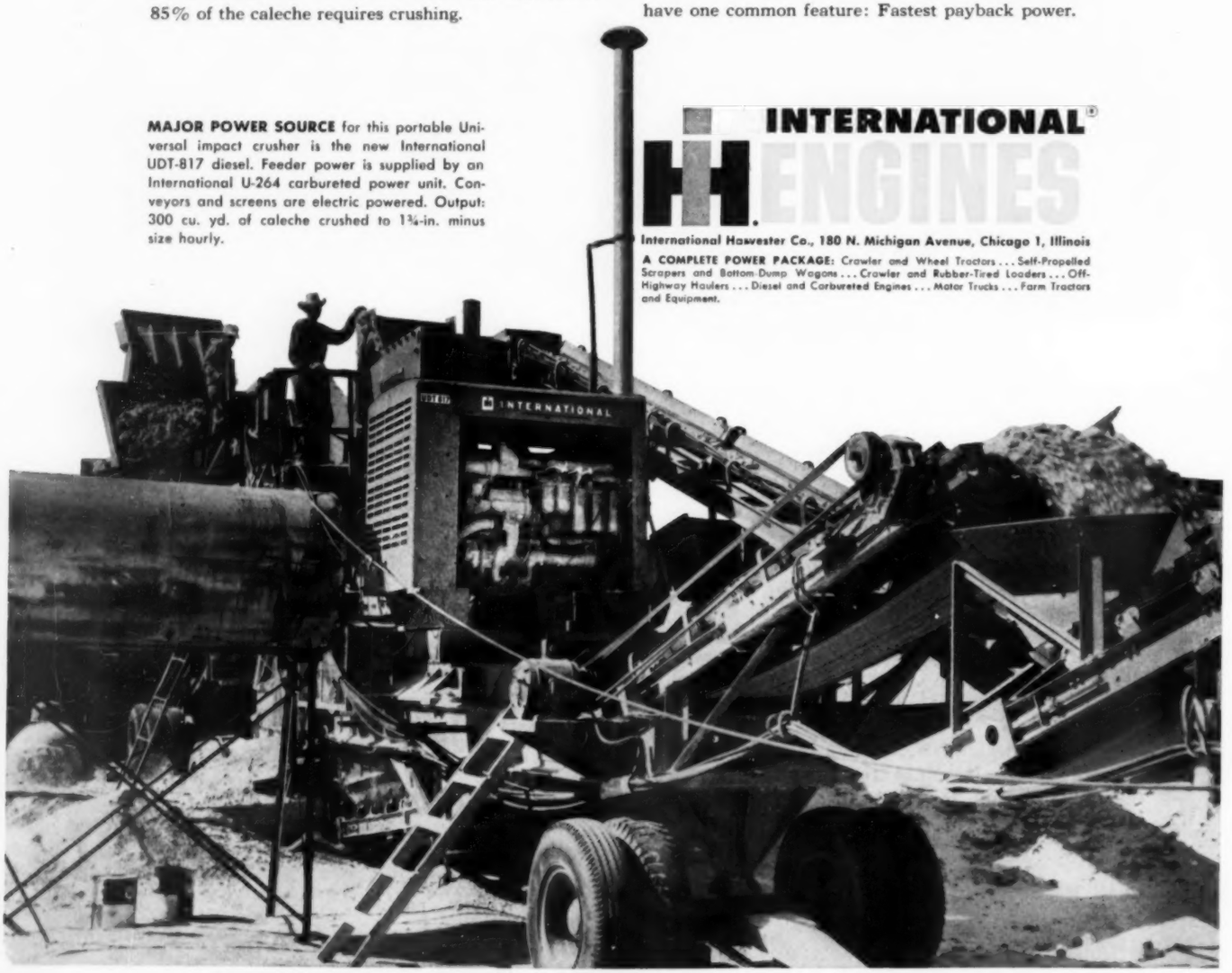
While the new 385 hp. UDT-817 diesel heads up the International engine line, you can choose from 31 other diesel and carbureted models ranging upward from 16.5 hp. Save on repowering and operating costs by checking your International Power Unit Distributor or Dealer or by specifying dependable International power in new machines. All 32 International engines have one common feature: Fastest payback power.

MAJOR POWER SOURCE for this portable Universal impact crusher is the new International UDT-817 diesel. Feeder power is supplied by an International U-264 carbureted power unit. Conveyors and screens are electric powered. Output: 300 cu. yd. of caleche crushed to 1¾-in. minus size hourly.

INTERNATIONAL®
HH ENGINES

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.



Here's why it pays manufacturers to specify Purolator air filters as original equipment

Materials Service Corporation of Lyons, Illinois tested Micronic® dry-type air filters for one year in its trucks and compressors. Even in the dust and dirt of contractor operations, these Purolator filters went from 6 to 8 weeks without servicing; lasted up to 3 months before replacement.

"We proved Purolator could save us up to $1000 per year per truck"

—Materials Service Corporation

Savings from reduced labor, parts cost, and maintenance downtime — plus prolonged engine life — amount to as much as $1000 per truck each year.

That's the verdict from Materials Service Corporation, after testing Purolator dry-type air filters in its trucks and compressors for a full year. At present they are operating trucks 6 to 8 weeks between element servicings. And their Purolator dry-type air filters are used up to 3 months without replacement.

These savings are common in fleets equipped with Purolator Micronic® dry-type air filters. That's because this Purolator filter is more than 99% effective at *all* engine speeds; its controlled porosity keeps all harmful particles from reaching the upper engine; it's easy to maintain and replace.

Remember these benefits the next time your customers specify Purolator Micronic air filters. Think about them, too, in considering Purolator air filters for original equipment on your own standard line of diesels.

Ask a Purolator Engineer to demonstrate how Purolator filtration provides advantages and economies for fleet owners — and benefits for you. Write or call today — and ask for the booklet, Purolator Micronic Dry-Type Air Filters.

Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA

Morrison-Knudsen Company, Inc., employs M-R-S Model 250 Tractors and Model 250 HW 40 cu. yd., struck—50 yd. heaped—Scrapers on this dam project in Leesburg, Ala. Morrison-Knudsen recently purchased 4 of the R-1550 ROADRANGER-equipped M-R-S Tractor-Scrapers and a 5th Model 250 Tractor used primarily for powering compaction rollers—the company's 3rd purchase of M-R-S 250 combinations in a year. The recent purchase brings the total for the Leesburg job to *eight* M-R-S 250 Scraper combinations and *two* M-R-S 250 Compaction Tractors.

Geared by FULLER . . .

50 YARDS, heaped, with R-1550 ROADRANGER

This M-R-S Model 250 Tractor employs a 600 hp diesel engine and a semi-automatic 9-speed Fuller R-1550 ROADRANGER Transmission to pull an M-R-S 250 HW Scraper with a heaped capacity of *50 cubic yards.*

Standard equipment on the huge tractor, the R-1550 ROADRANGER features nine forward and two reverse speeds, selected with a single shift lever. With short, even steps—averaging 38% — between forward ratios, the engine can work in the peak hp range at all times, resulting in fast, economical scraper operation.

The Fuller Air-Powered Countershaft Inertia Brake on the R-1550 ROADRANGER permits quick, easy up shifts without double clutching, and the Fuller Pressure Filtration and Lubrication System provides positive lubrication, maintains clean gear oil and prolongs gear and bearing life.

For faster work cycles, lower fuel consumption, longer engine life, less operator fatigue, GREATER PROFITS . . . specify Fuller Transmissions.

FULLER — TRANSMISSION DIVISION — MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.
Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

STARTING A DYNAMIC DECADE

Here Is A Special Staff Written Report to Buyers and Users on New Developments and/or Improvements in Diesel and Natural Gas Engines, and Accessory Equipment for 1960

MARK 1960 in your book . . . it will be a good year for users of diesels and natural gas engines because a wider, more efficient range of engines and accessory equipment will be available. On the other hand, it should be a year in which engine manufacture reaches its highest level of production. It is, in fact, a year that starts one of the most important decades in the overall production and application of these efficient prime movers. The reasons for this are many, but these are the most important: 1. Engine builders and equipment manufacturers in the last few years have expended vast millions of dollars in product research, development and testing; plant expansion and modernization; distribution and service facilities. Any way you figure it, this represents a tremendous investment in the future of the engine industry. 2. The results of this accelerated product development program gives you, the engine user, a broader selection of modern equipment tailored to your job requirements than has ever before been available. Not only are these engines well suited to the high volume existing markets, but many are built specifically for new applications as well. 3. Not only a supply of better diesel and gas engines, but a very definite need for equipment of this type to increase productivity and reduce operating costs. 4. As the result of expanding markets and new product development, competition, both domestic and foreign, has become exceptionally keen. This will still further accelerate product development and reduce product cost. These forces then, taken collectively or individually, cannot help but have a dynamic effect . . . they are the crux of the high level of activity we will witness in 1960 and the years to follow.

The man behind all this activity, of course, is you, the engine user—in the final analysis you sit as lawyer, judge and jury. Engines and equipment must measure up to your requirements and we believe this is what you are looking for in 1960:

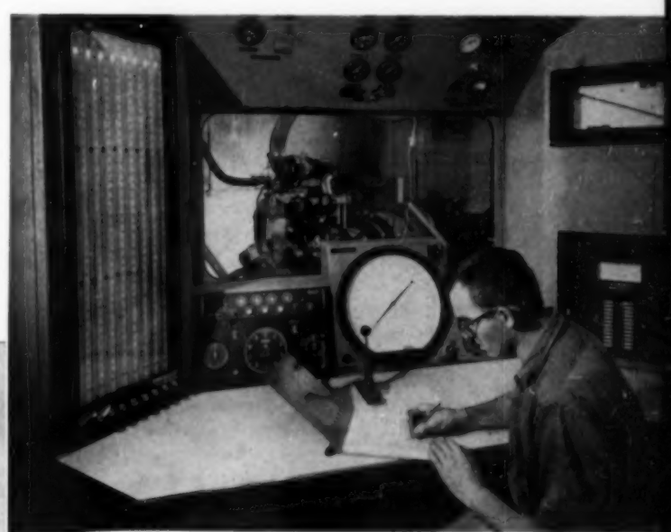
1. Improved operating flexibility
2. Greater power availability
3. Better power adaptability
4. Less weight per horsepower
5. Reduced engine maintenance costs
6. Improved specific fuel consumption
7. Longer overall engine life

This is quite a list of requirements, yet it is the basis for the work the diesel and gas engine industry has been doing to provide you with equipment that will meet your demands and help combat rising operating costs. In late 1959, the staff of DIESEL AND GAS ENGINE PROGRESS, in personal interviews and questionnaires asked the many manufacturers that comprise this industry to report on new product developments and/or improvements that will be brought to you, the buyer and user, in 1960. The results of this survey enables us to present the following INDUSTRY REPORT. The first part of this report covers new and/or improved engines by their application. The second part presents new products and trends in accessory equipment development.

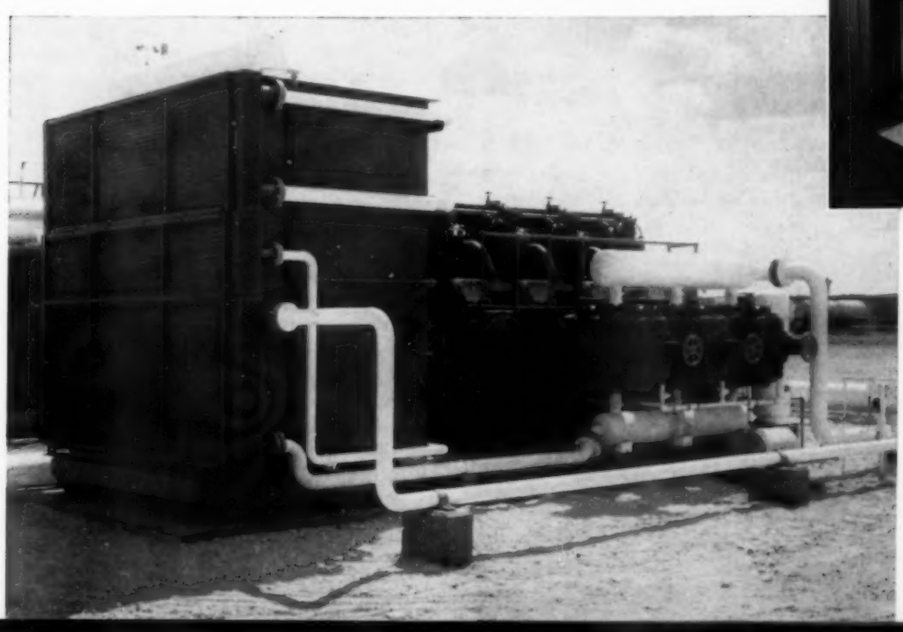
Diesels for Trucks, Buses, Taxis and Other Commercial Vehicles

Without doubt this will be one of the most important fields of engine development and application during this coming year. Let's take a look at OTR diesel tractors. Expect competition for OEM business to be extremely keen as several engine manufacturers come into the picture for the first time.

Horsepower range of engines for this service is now 160 to 375 hp and in many cases you will find a sharp reduction in weight/hp because even greater emphasis has been placed on aluminum components, turbocharging, V-type configurations, and general design compactness. Several builders now have diesels above 300 hp for OTR service and it's likely that some more will be added before the end of the year. Look too, for longer warranties from the engine manufacturers. For the 16,000 to 35,000 GVW vehicle class you will find available a strong concentration of new and improved engines with weights at or approaching the gasoline engine and prices more attractive than before. Last year saw a big push by engine builders to achieve lower fuel consumption; this to continue.



Modern, well instrumented engine test cell typifies new facilities for research built by engine builders.



One of the new 550 hp package gas engine compressor sets installed for gas gathering. This unit operates without any protective shelter.

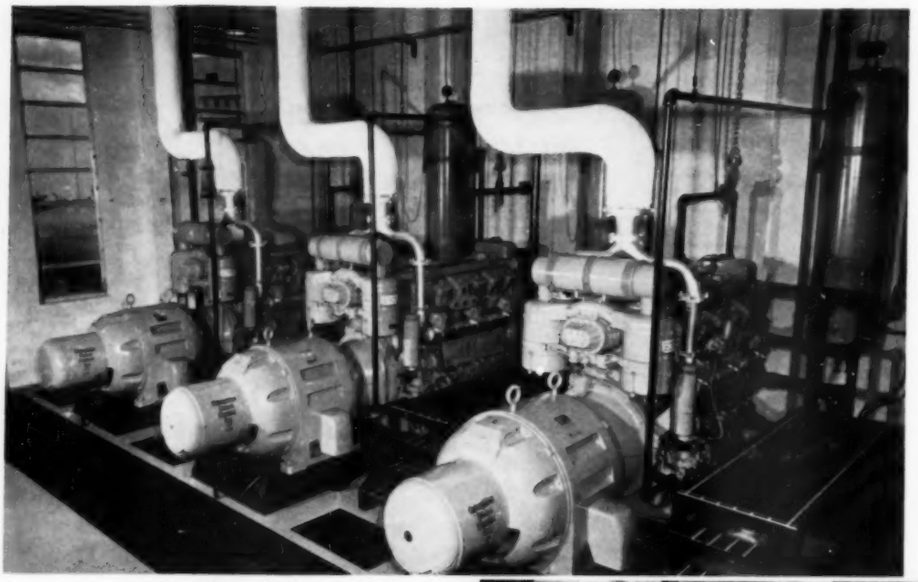
As dieselization of OTR fleets continues, the truck engine builders in 1960 will be hitting strongly for terminal delivery and "stop and go" truck applications. In many ways, 1959 was a year of experimentation in this area and operating records are now available in sufficient quantity to show the economy of the diesel in this type of service. At least six builders are ready with engines ranging in size from 60 to 150 hp and several more should be introduced as the year progresses. First and

This 97 ft. harbor tug was converted to a new engine gear propulsion system and horsepower was increased 267 per cent.

most logical target will be the fleet operators with in-city delivery equipment of 35,000 GVW and down—then the other classes of pick-up and delivery vehicles from 3000 to 12,000 GVW. Manufacturers will concentrate on operators equipped to handle fleet type maintenance. Both in-line and V type engines will be available, most of them naturally aspirated. Many of the new engines are specifically designed for this service, others are smaller counterparts of proven larger truck diesels. Competition should bring price/hp downwards and this, plus at least a conservative 50 per cent reduction in overall operating costs gives you an attractive installation. Important too, the builders have given special attention to noise level, vibration, size and horsepower requirements to make strong inroads into the taxicab field in 1960. A wide variety of engines, both domestic and foreign, are now available for cabs and of the better than 100 that are operating in the States at this time, all appear to be giving the type of service that will result in diesels rather than gasoline engines in a lot of new equipment. The diesels, with special flywheel housings and a complete adaptor kit are easily matched to standard transmissions. As an operator, you can expect at least twice the engine life before overhaul, general lower cost maintenance, and twice the fuel economy of gasoline taxi engines. These facts coupled with the lower cost of fuel add up quickly to substantial savings.

Diesels for Construction and Off-highway Equipment

Alert to your demands for larger, more compact diesels, the engine builders now have a substantial number of 300 to 650 hp diesels available. Several engines above this range (to 800 hp) are now being developed for possible introduction this year. Expect continued emphasis on turbocharging and inter-cooling, V-type configurations in the higher horsepower models and an increasing number of engines for better power selection and subsequent improved efficiency. In 1960 you will also find it easier and more economical to standardize on diesels for your smaller pumps, compressors, generators, etc. A wide range of diesels from 60 hp down are available either in manufacturers equipment or for field repowering. Engines both air cooled and liquid cooled are being used in greater numbers and they now easily fit the space occupied by a gasoline engine, feature diesel advantages of greater stamina, less maintenance and lower fuel costs. Engines range from one to four cylinders and as low as 3-4 hp.



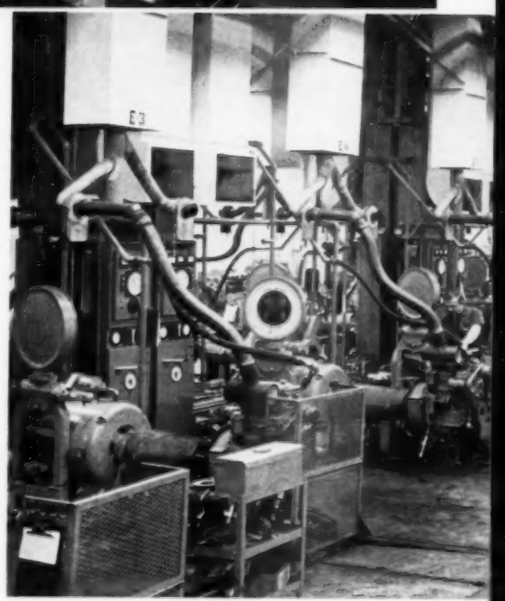
Compact and reliable, these three diesel generator sets provide emergency power for a large southern hospital.

Diesels for Farm and Irrigation Service

Probably nowhere has the diesel and natural gas engine had greater impact in the past few years than in this field. In 1952 only 6.3 per cent of the U. S. production of agricultural tractors were dieselized. This percentage rose dramatically to 23.2 in 1958 and will be well above 35 per cent by the end of 1960. Why the increase? Larger farms, increasing costs and special power requirements. Now 1960 will see more new diesel equipment available than has ever been offered before and at prices that will be more attractive. Competition among both foreign and domestic builders is one of the big reasons, but new tooling and better adaptability of a wider range of diesels is also a significant factor and you will be seeing more diesels 50 hp and below offered in farm equipment. For a more comprehensive report see the November 1959 issue of DIESEL AND GAS ENGINE PROGRESS. Expect to see diesel and gas engines as the most efficient power source for deep well irrigation pumping applications, emergency generator sets and similar applications now that investment in facilities and equipment have reached the point where any type of failure can be extremely costly. Engines for these services range from 4-6 horsepower up and throughout the entire range all are well proved in field service.

Engines for the Petroleum Industry

The natural gas engine makes the biggest news for the petroleum industry in 1960. Now almost all of the major manufacturers of engines in the medium 200-600 horsepower range have new or greatly improved units. Gas engines, a mainstay in oil and gas production and transmission for a number of years, are moving well into other areas of application—drilling, water flooding, etc. The new engines, both in the medium range and higher again will feature turbocharging, inter-cooling, better weight/horsepower, and more simplified maintenance. Compression ratios will be higher, as a rule, ignition systems will be simplified for



Production line dynamometer testing department of one of the major diesel engine builders.

longer life, engines will burn a wider variety of gaseous fuels and improved carburetion will have a measurable effect on economy. All of the gas engine manufacturers are offering engines with greatly improved specific fuel economy. New, more compact and better controlled engine electric drilling packages will make their appearance with the manufacturers offering greater operating flexibility through engine and fuel interchangeability. In the well servicing field, primarily in fracturing units, expect more of the high horsepower engines and the use of twins as power demands increase.

In this January issue we present a separate article on the trend to packaged compressor sets for gas production. All of the major manufacturers are now offering these units and the economics of their application are brought out very clearly. In the gas transmission industry, attention by the manufacturers appears to center on engine-compressors, both angle and centrifugal compressor types, for pipe line booster service. A new turbo-

charged V-type engine in the 4000-6000 hp class will have its initial installation during the year and you can look for some higher ratings from established lines of angle-compressors. This reflects continuing development work among these builders as they go to higher Bmeps through improved turbocharging, intercooling and combustion chamber design. Important improvements in engine control have also greatly added to the efficiency of these larger gas engines and more automatic, cost reducing systems will be introduced.

Diesels for Marine Service

If you are coming into the market for propulsion power, either for a new vessel or for repowering, you will find a broader selection of diesels in the various horsepower ranges, particularly in the 500 hp and below class, than was the case in early 1959. New or improved engines feature improved cooling and lubrication systems, greater accessibility to accessory equipment, greater use

On-highway mechanically refrigerated trailers are now being volume produced. Reefer power is supplied by small lightweight diesels.

of non-corrosive metals, ability to burn a wider range of diesel fuels, etc. Availability of more V-type and/or turbocharged engines together with the above improvement will give you more compact power, greater economy and higher propulsion speeds when desired. For small workboats and pleasure craft, now predominantly gasoline engine powered, you will see sound evidence of the advantages of converting to diesels. Many engine builders have designed especially for these applications and offer lower weights, excellent adaptability to existing hull designs, and improved drive arrangements. Expect to see a growing use of air-cooled diesels as well as outboard propulsion units. Both have been successful in a variety of applications and interest is mounting in the latter unit for bow steering. The larger, slow speed engine builders have made important headway in the last few years on the inland waterways and Great Lakes with higher horsepower, turbocharged, in-line and V-type diesels and have achieved very pointed success in heavy fuel oil burning. These higher horsepower engines have racked up signification operating records in towboat service as well as in the larger lakes vessels.

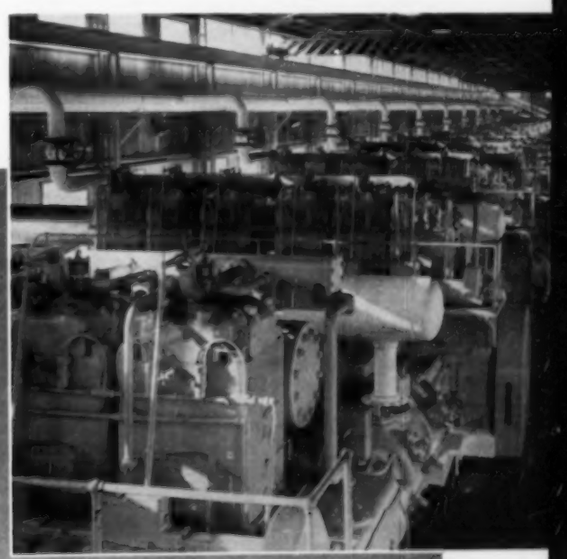
Engines for Municipal Power Plants, Sewage Treatment Plants and Utilities

Three key areas of development and application of medium and large diesel, dual fuel and natural gas engines will merit your attention in 1960. By and large, builders will be more concerned with increasing the output of their established engines than in producing totally new engines. Number one, look for further improvement of the V engine especially in areas of cylinder design and manifolding to achieve greater power without sacrificing component life. Two, expect slightly higher operating speeds and greater thermal efficiency. Three, expect manufacturers to offer more extensive engine temperature and operating controls in the interest of better engine service and lower maintenance costs. Because of new equipment on the market and greater experience you will find that engine builders today are in a far better position to handle heavy fuel oil installations. In anticipation of a substantial demand for engines capable of burning sewage gas, several builders have made key design changes and new engines installed in 1960 will be ideally suited to the application. A great deal of work has also been accomplished in the field of medium and large mobile diesel generating sets. Units are unusually compact, with individual sets ranging to 2000 kw. Most of the units are available as complete packages, platform mounted and enclosed, unusually well instrumented, and ready for immediate high line hook-up or other connection.

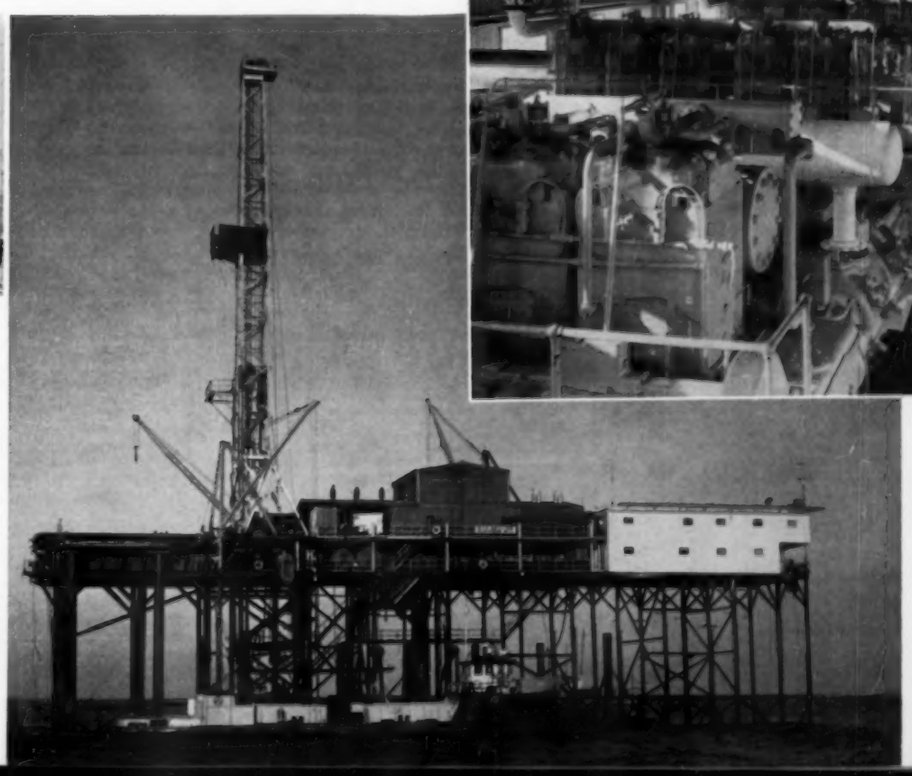
Locomotive Diesels

Recognizing the low profit margin and tight money situation confronting you today, the major suppliers of locomotive diesels are continuing development work to provide equipment that will enable faster, more economical freight and passenger service. This work has been concentrated in new diesel locomotives and "up-grading" or "re-profiting" programs. Both accomplish the major objective of increasing motive power and reducing operating costs. Single importance is attached to the new lines of high output, turbocharged diesels now available in sizes to 2400 hp. In introducing these lines, builders have taken a close look at engine maintenance and incorported substantial changes in the fuel, lubricating and cooling systems as well as in internal engine components. The new engines invariably offer lower fuel consumption and can burn a wider variety of the heavier economy fuels. Work accomplished in the last several years in mechanical refrigeration field will undoubtedly pay dividends in 1960. The packaged reefer units now available all incorporate proven components for this type of service and develop-

One of the large gas pipe line stations houses 14 natural gas engine compressor units. Prediction is that demand for gas will double by 1975.



One of the latest offshore drilling platforms depends on diesels for a wide range of services.



A farm tractor puts the lugging power of a diesel to good use in preparing soil in a rice field—one of the toughest farm jobs.

ment work this year will be concentrated on making these reefer units even more reliable through design simplification.

Fuel Injection Equipment

This is one of the most active fields in the overall accessory group. By the end of 1960 at least one totally new distributor type fuel pump for automotive and industrial engine application will be introduced. Distributor type pumps generally will continue strong and you can look for price reductions based on better, more simplified designs and newer production facilities. Because of limited installation room on the newer, compact diesels, expect in-line pumps to show the same trend to compactness and simplicity. New on the market for 1960 will be V-type pumps with fuel limiting governors for multi-fuel use with both V-8 and 12 cylinder engines in both automotive and military applications. Major attention in 1960 will also be given to perfection of a variety of controls and governing devices to attain optimum performance from the new high horsepower automotive diesels. The past few years have seen excellent strides in injector design aimed at better combustion and longer life and this will continue. Also look for the possible development of inexpensive "throwaway" nozzles. One major manufacturer will introduce early in 1960 a hydraulic throttle control which eliminates mechanical linkages and has good acceleration characteristics. Expect too, to see more development work on pumps for dual fuel engines, primarily those for sewage plant service.

Cutting maintenance time and costs in the 37,000 GCW class are turbocharged diesel OTR tractors such as this.

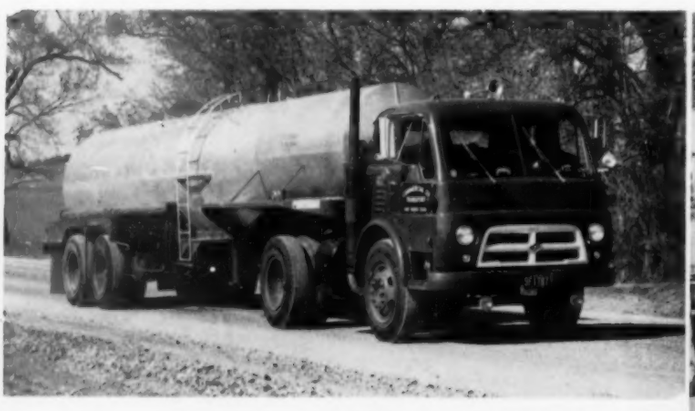
Governors

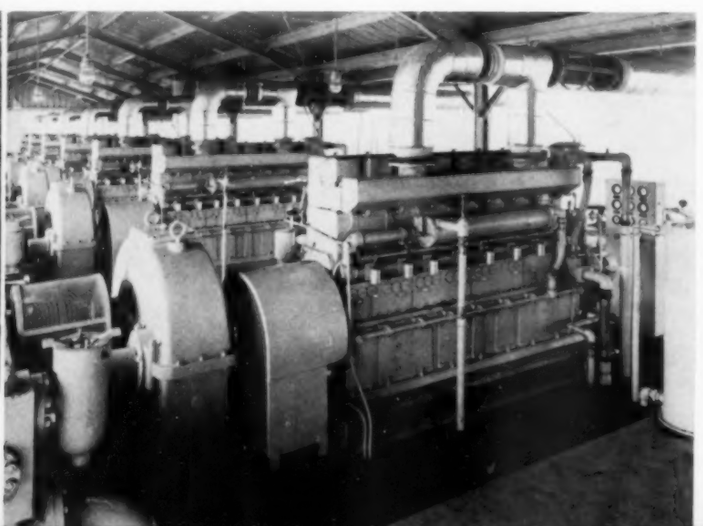
So much is new in the field of engine governing for 1960 that we will shortly be publishing a full scale analysis of this development. Important work is being done in all phases of mechanical, hydraulic and electrical governing of engines, and equipment available in 1960 will be far superior to that accepted as standard a few short years ago. Control of supercharged diesels to limit fuel as a function of charging air pressure was introduced in 1959 and will be built into controls for many of the large engines for locomotive, marine and stationary applications. This feature limits fuel to values which can be burned cleanly with the amount of air available for combustion at the time. This control has the advantage of cleaner exhaust, better economy and the ability to accelerate and accept load changes without objectionable smoking. It will be of special interest to builders and operators of turbocharged engines in the 400 to 3000 hp range. Governor control of Bmep to avoid overloading engines for variable speed centrifugal pumping and marine propulsion is now available. The advantage of limiting torque to predetermined values based on instantaneous speed will prevent overloads, lengthen engine service life and eliminate personnel responsibility for avoiding overload conditions. Load sending governors are not brand new, but development is continuing on variations of these governors for special applications. In addition to their performance advantages, they are also applicable where the advantage of isochronous paralleling justifies their use. In the small vehicle field, new auxiliaries will be made available to allow engine derating as a function of altitude or air box pressure. Also the lower top limit of speed setting can now be established as a function of road speed and gear shift selector position for cruising economy. In the field of remote control of speed setting, accurate continuously variable electric speed setting will be available which can be used for single or paralleled units. A new hydraulic isochronous governor will be available for engines in generator, locomotive, marine and pipeline service. It has a work capacity of 10-15 ft. lbs. and will be available for either variable or constant speed applications. Watch also for a small hydraulic isochronous governor for small, highspeed diesel generator sets—it weighs 3½ lbs.

Turbochargers

The trend toward developing turbochargers as an integral part of diesel engines and continued advancement in the design of turbochargers as matching components of the power plants will gain greater significance in 1960. This means tailoring components for more compact installations. It also involves greater use of control systems to obtain optimum operation over a greater engine speed range. This will require greater refinement of turbocharger characteristics and the design of even more rugged components to improve overall reliability. Watch too for steadily increasing turbocharger pressure ratios to permit higher engine outputs at all altitudes. Because of higher pressure ratios, the use of small, highly efficient intercoolers with turbochargers will increase. There will also be activity in the adapting of multiple small turbochargers in the medium horsepower gas and diesel engines. With so many new small diesels coming into the market, the application of turbochargers will expand in this area. Small turbochargers are available from several manufacturers for engines in the 70 to 150 hp range for all types of applications and will contribute improved hp/weight ratios in these engines. While the larger natural gas engines have been turbocharged for some time you can expect greater compressor and turbine flexibility and better matched units with lower maintenance. Smaller and medium power natural gas engines are a relatively new field for turbocharging yet notable success has been achieved in this field and the demand will grow. In their de-

Eight 500 hp natural gas engines driving horizontal pumps inject 120,000 bbls. water/day in water flooding project in southern California.





Among the high capacity haulers introduced in 1959 was this 64 ton bottom dump semi powered by a turbocharged 400 hp diesel.

One of the most popular sized diesel towboats in 1959 was this 148 ft. vessel used for high speed tows on Mississippi.

velopment programs, major manufacturers have established excellent facilities to speed research along the lines indicated.

Generators and Electrical Equipment

In a move to reduce installation space and make generators as maintenance free as possible, all of the major manufacturers have brought brushless type equipment to the market. Many models now are available up to 300 kw, and you will find them well suited to applications which previously presented operating difficulties. All generators are usually equipped with static magnetic amplifier voltage regulators and built-in voltage boost transformers. The units can be operated in parallel when provided with reactive droop compensation. To simplify installation on the engine, a series of adapters and disk-type flexible couplings are available to fit standard SAE flywheel housings. Packaged type engine-generators in the 10 to 500 kw range are now available from many more sources, which means better adaptability to your specific needs, lower costs through greater standardization of components and better delivery. Credit the demand for sets by the government for rapid advances in these generator sets. Their demands for precise power now makes this advanced equipment available for industrial and commercial applications. Improved electrical equipment is also available for automotive service and new two piece alternator systems including self-rectifying generators and transistor regulators will be replacing standard dc equipment on on-highway trucks. First cost of these two-piece systems is higher, but reduced maintenance and longer battery life makes it a good investment.

Taxicab operators are finding that diesels substantially reduce operating costs. Engines for this service range from 50 to 100 hp depending on vehicle size.

Starting Motors and Equipment

Higher horsepower diesels, longer service life between overhauls, more rugged operating conditions, and countless other factors are the underlying forces behind the rapid advance in heavy-duty starting equipment. Clutch drives have controlled engagement and release, enclosed shifting mechanisms, over-running protective features, etc. Totally enclosed cranking motors are now available pointing the way to lower maintenance and another starting motor is slated for introduction with solenoid integral and in-line with the motor case. Twelve volt starting motors should find increasing wide acceptance in both on and off-highway equipment. Hydraulic cranking motors are substanitally improved and simplified—and in addition to their automotive and industrial applications are also being tested for remote stationary engine starting applications. Starting aids for the entire range of engines operating in cold weather have advanced rapidly and systems with this equipment are easily installed and operated.

Air, Fuel and Lube Oil Filters

Good filtration equipment has always been essential to insure long engine life and in 1960 the manufacturers will continue their program to supply you with equipment with increased efficiency and lower maintenance requirements. Improvements in media are continually being made to increase effectiveness and give longer service life. There are, however, some new developments that are quite a departure from previous practice. Major among these is the dry type air filter which in a few short years has gained extensively in off-highway application. It is also being developed for on-highway truck use. Full-flow lube oil filtration

Tandem-trailers now operating on the eastern thruways have a maximum GVW of 127,400 lbs. Diesel tractors ranging from 335 to 375 hp at 2100 rpm are used.

New locomotives with 2400 hp turbocharged diesel-electric power give the railroads faster speeds or greater hauling capacity.

continues to gain popularity in all types of diesel application. Development certainly will continue in this area. A new, heavy fuel oil centrifuge with capacities from 1000 to 6000 gph will be introduced shortly and another significant development in separating and treating Bunker C fuels will be announced early in the year. Air filtration systems in large engine installations to actively condition the air as well as filter it are also becoming more popular.

Lubricants

Better crankcase oils, rather than totally new products, is the primary result of the vast research, development and testing programs being carried on by the major producers. One key area of activity surrounds the use of multi-grade lube oils for dieselized equipment subject to cold weather starting and operating conditions. Here the 10W-30 oils in test applications have done well and they warrant further investigation. The greater use of high out-put, turbocharged diesels with increased pressures is spurring continued development of heavier duty lube oils. Greater attention will be focused on large stationary natural gas engine lubrication and one major is now announcing several grades of gas engine oils, two of which contain special additives to provide extra oxidation resistance. With the finger pointed squarely at lower maintenance costs, oil companies will continue to focus their attention at producing oils that keep operating parts cleaner, less subject to corrosion and have greater metal adhesive qualities.

Transmissions, Clutches, Marine Gears

A substantial number of new transmissions, clutches and related equipment will be available in 1960. One of the major manufacturers has incorporated an air powered countershaft inertia brake as standard equipment on all of its heavy-duty, off-highway transmissions. Also ready is a new, air-actuated gear shifting control unit for on-highway diesels, a new five-speed large heavy-duty transmission for off-highway diesel equipment, and a new nine-speed heavy-duty on-highway truck transmission. Several new power shift-transmission lines designed primarily for off-highway diesels, will be brought out in 1960. A new, heavy-duty 17 in. clutch for the larger, higher horsepower diesels should also be ready this year. Several manufacturers will come more actively into the field in 1960 as the diesel moves into the small and medium duty trucking fields. A new single stage torque converter is now under development that from a cost and application standpoint will have great market impact. On an overall, expect to see better matching of clutches, transmissions and axles on equipment in 1960. Better efficiency, lower maintenance are keynoting this move. Continue to look for more power-shift transmissions utilizing torque converters in a wider variety of off-highway equipment. Trend to higher horsepower marine diesels has sparked development of several new gears and each stresses compactness and simplicity. Most recent is a pneumatic r&r gear utilizing externally mounted air-actuated clutches.

Engine Testing Equipment

It looks now like a major program will be underway in 1960 to bring a wide range of diesel test and servicing equipment to the automotive diesel fleet operators. Several new test stands will be placed on the market. By and large these are compact units, some for testing specific types of fuel injection equipment, others that can be adapted to suit a wide variety of pumps and nozzles. With both the ADS and SAE striking out for standardization, this equipment will not only fill that need, but insure better quality control, faster servicing and longer equipment life. You can expect new equipment to require less field servicing upon delivery as more and more manufacturers are instituting dynamometor testing programs. Many new tools to fit numerous service needs will be produced and one major supplier has stated that he will be developing and introducing over 100 new special service tools this coming year.

Greater adaptability through compactness, higher speeds and improved economy now make the diesel well suited for truck service below 35,000 lbs. GVW.

Heat Exchangers

Design of heat exchangers continues to focus on more compact sizes that still give maximum heat transfer with low restriction of air flow. New processes for core production with better, corrosion resistant metals being used are adding to the longevity of various makes. A wider range of sizes and capacities are available and attention is being focused on new, compact intercoolers for new, higher pressure turbochargers in large and small engines. New designs in smaller, efficient radiators are now available for packaged type generator and compressor sets.

Controls and Instrumentation

The trend to automatic operation of diesel and gas engine power plants, based on factors of lower cost operation, better engine efficiency and greater safety, will pick up momentum especially in gas and oil pipeline installations and power plants serving sewage treatment facilities. The range of new controls and systems prevents coverage in this article, but new hydraulic and pneumatic techniques coupled with electronic systems will continue to be refined in efficiency and simplicity, both from an installation and operating standpoint. Expect also to see automatic controls for production pumping, as well as for irrigation, refrigeration and other applications requiring timed operating sequences based on pressures, temperatures, etc.

Pistons, Rings and Bearings

Custom engineering of these products in the vast majority of cases precludes elaborate comment. The success nickel alloy piston inserts have had is now history and certainly this application will grow. Now a very important development is the use of ductile iron chrome rings in the top groove as mean effective pressures increase on the higher output diesels. High impact value of this alloy substantially eliminates breakage. Important too is the use of metal sealing rings. Solid aluminum bearings, steel backed aluminum and tri-metal bearings—all have characteristics that will see their use continue. Another new development is the use of welded zones of hard, wear resistant aluminum alloy on aluminum pistons of automotive diesels.

MAN-MADE SNOW KEEPS SKI SLIDES OPERATING

Key To Snow-Making Machine at Michigan Area Is Diesel Driven Compressors

By J. W. BROWN

Beginners' ski slope at Mt. Christie Ski Resort Area near Oxford, Mich., showing shed at left which houses the snow-making equipment. One of the water mains extending out from the plant parallels this ski slope.

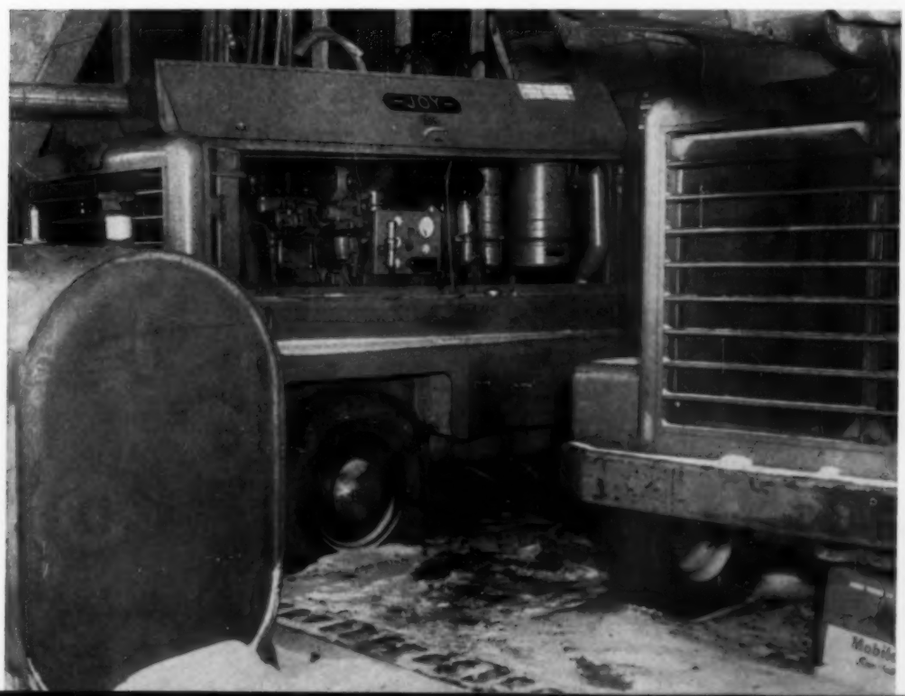
IN recent years the state of Michigan has become second only to California in number of ski resorts. Michigan, at last report, had 64 well-established skiing resorts; others were being planned. At least nine skiing slopes, complete with tows, are within a 40-mile radius of populous Detroit. The upper part of the state, especially the Upper Peninsula, is favored by nature with much snow from October to May, but it is only through the advent of the "snow-maker" that ski resorts in the southeastern part of the state have become popular. The use of diesel-driven equipment to form the feathery white crystals needed to blanket the ski slopes is an "off-beat", but potentially important, application for diesel engines. Five or six snow-makers are located in the immediate Detroit area.

A snow-making system usually consists of one or more high-capacity air compressors, a good water well and pump and permanently installed piping. As in overhead irrigation systems, portable, quick-connect laterals, equipped with special sprinkler nozzles, are hooked on to the main water-supply lines so as to cover the tow slopes and ski slopes with man-made snow. At the sprinklers, the compressed air and water meet to discharge a very fine spray of moisture droplets. When temperature and humidity conditions are right (28° F. or lower and not over 69% humidity) the result is a fluffy snowfall of just the right texture for ideal skiing. The wind must be sufficiently lacking to enable control of the snow application. The same kind of job can be done with hand-held nozzles, but these are usually only a temporary substitute for the more satisfactory pipe and sprinkler systems.

Typical of the snow-makers operated in the lower Michigan skiing areas is the permanently installed system in use at the Mt. Christie Ski Resort near Oxford. Resembling a sprinkler irrigation system likely to be found on a large farm, the water supplying portion of the system consist of mains and movable lateral lines which carry revolving sprinkler heads. Water is drawn from a 195 ft. deep well and pumped to the discharge point at the rate of 1000 gpm. Heart of the snow-maker at Mt. Christie—and what distinguishes it from an ordinary irrigation system—is formed by two Joy rotary air compressors powered by GM Diesel 6-71 engines. The two 600 cfm compressors work in parallel to supply 1200 cfm of air. Each sprinkler requires 100 cfm of air to operate effectively. This limits the number of sprinklers which can be operated simultaneously to 12. Because the laterals can be moved easily from one connection on the mains to another, a wide area can be covered. The Mt. Christie snow-maker is designed to cover about 50 acres. Outlets for lateral connections are arranged at 30 ft. intervals along the main line. This provides flexibility in applying the snow to any one of the three ski slopes.

At Mt. Christie, where the water supply is ample, the only limiting factor is the air supply. This makes the diesel-driven compressors the "key" to a highly efficient system of snow-making. Mt. Christie's lodge manager, Mr. Bob Jackson, reports that the snow-making operation is generally conducted at night after the 11 o'clock closing hour. The air compressors average 10 hrs. of use per night at 1800 rpm.

Diesel-driven snow-making equipment is providing insurance for southeastern Michigan ski resort operators against the possibility of scant snowfall and long periods without snow.



Heart of Mt. Christie's snow-making plant is this installation of two rotary Joy air compressors powered by GM Diesel 6-71 engines equipped with Harrison heat exchangers.

BUILDING A 12,300 FOOT JET PLANE RUNWAY

Allis-Chalmers Diesel Engines Supplied Brawn For Equipment Building A Midwest Air Base: Installation is Good Example of Hardworking Construction Machinery

BONG Air Force Base in the fertile farmland area near Kansasville in southeastern Wisconsin was started last year as a multi-million dollar home for jet bombers of the Strategic Air Command. Cost of the project had been figured at $65 million and over $20 million of that total had been let in construction contracts by September when the Air Force halted construction of the base. Air Force officials explained that reassignments of air groups had made the new air base unnecessary. Some of the construction already started will be completed because, officials said, it would cost as much to cancel as complete them. The future of the partly-completed base is uncertain; some congressional and local leaders have proposed that it be turned over to a Wisconsin-Illinois joint commission for use as an international jet airport.

Before the Air Force action, DIESEL AND GAS ENGINE PROGRESS visited the huge project to watch how diesel engines contributed to the task of laying the nearly 2½ mi. long runway that had been slated to bear the weight of huge military bombers. And, although base construction is in "mothballs", the story is a good illustration of hard-working diesel construction equipment.

* * *

The concrete runway at Bong, originally scheduled to be 11,500 ft. long and 200 ft. wide, later was redesigned to 12,300 ft. Taxiways of the same length will be 75 ft. wide. The pavement, with an average thickness of 16 in., will require approximately

This Allis-Chalmers D-344 generator set (60 cycles, 40 kw, 1800 rpm, 240 volt), driven by a 4 cylinder, 88 hp at 1800 rpm diesel, supplies electric power for the crushing plant.

Driving the pug mill is an Allis-Chalmers 16000 power unit. The 6 cylinder diesel has a displacement of 844 cu. in. and is rated 230 hp at 2000 rpm. A 16000 power unit also drives the Kimmes Construction Company's primary crusher.

Overall view of Kimmes' crushing plant shows trucks being loaded with sand and gravel, which will be hauled to the pug mill.

500,000 cu. yd. of concrete. Paving is scheduled to be completed at the end of 1960. Slated to supply sand and gravel for the runway and taxiway foundations are the S. T. Kimmes Construction Co. and Jeffries Construction Co. Each will supply a million tons of material.

Looking closer at the Kimmes' operation, the Hastings (Minn.) firm is utilizing 11 pieces of dieselized Allis-Chalmers equipment at its rock crusher and pug mill. Sand and gravel are crushed and separated at a pit three miles west of the base. The material then is transported to a pug mill south of the air field, where it is remixed, moistened and carried to the base for use on runways, taxiways and apron foundations. The Kimmes' plant and mill turns out 8000 aggregate tons per day; this material is transported in a fleet of 30 trucks with 10 cu. yd. capacity. Two 10 hr. shifts employing a total of 60 men are maintained on an operation that began June 25, 1959 and will continue through the summer of 1960. The crushing plant operates 20 hrs. per day, turning out 350 to 400 tons per hr. The pug mill runs 10 hrs. per day, mixing 800 tons per hr.

Four Allis-Chalmers HD-16 tractors with A-C 844 diesel engines push the raw sand and gravel mixture to a conveyor hopper at the crushing plant. The conveyor delivers the mixture to a Cedarapids primary crushing plant, where the rock is crushed to a 4 in. size and 90% of the sand is separated. Sand is taken from the crusher to a surge bin. The remaining gravel is further crushed and separated by a Cedarapids secondary crusher. The remaining sand is also removed. The separated sand and gravel is conveyed from the surge bins to the Kimmes trucks. The primary crushing plant is driven by an Allis-Chalmers 16000 power unit. This naturally aspirated 6 cylinder diesel, with a displacement of 844 cu. in., is rated 230 hp at 2000 rpm. A 21000 Allis-Chalmers power unit drives the secondary crusher. The turbocharged 6 cylinder 21000 engine, also with an 844 cu. in. displacement, is rated 340 hp at 2000 rpm.

Electric power for the crushing plant and compressors is supplied by an Allis-Chalmers D-344 generator set (60 cycles, 40 kw, 1800 rpm, 240 volt) with HC-3 switchboard and an A-C Norwood works generator and regulator. The 4 cylinder, 344 cu. in. diesel engine is rated 88 hp at 1800 rpm max. All of the engines burn No. 2 diesel fuel.

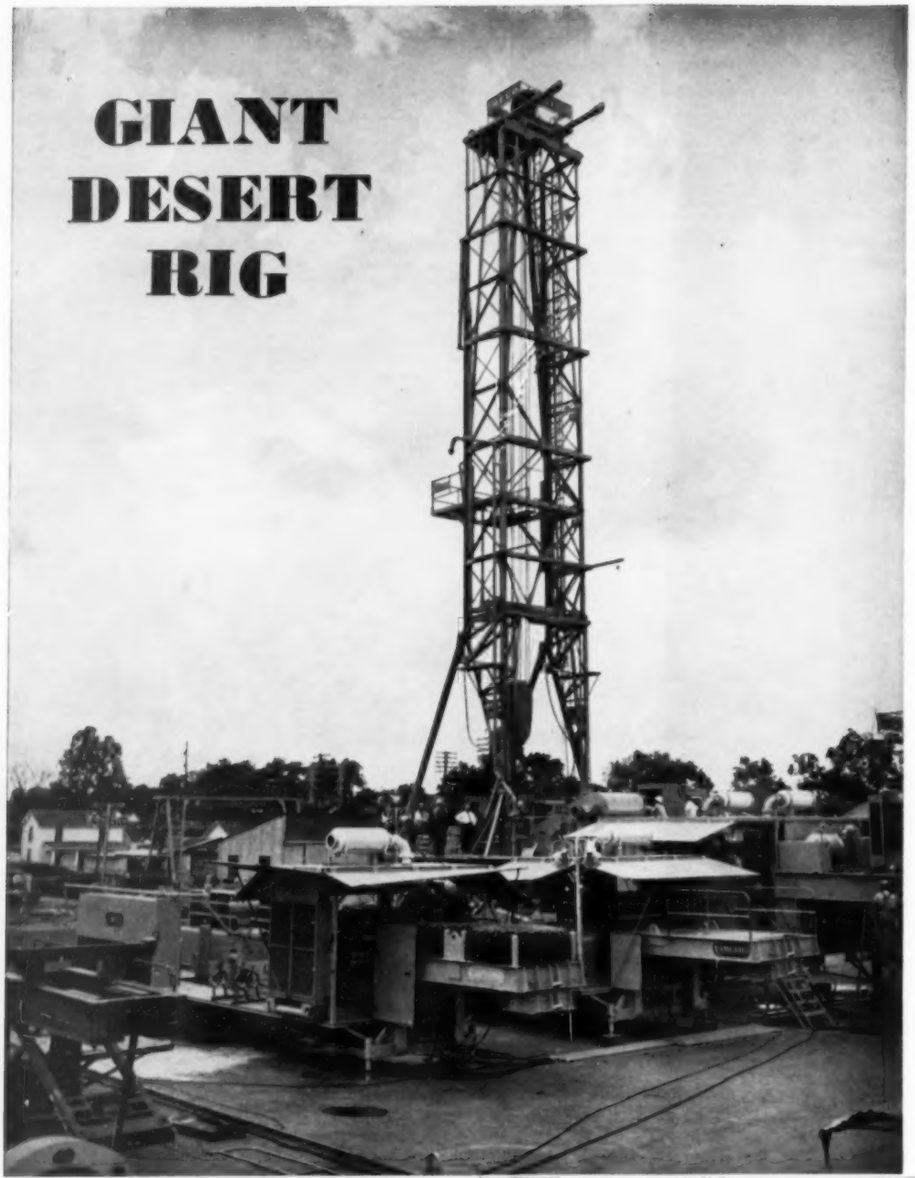
Sand and gravel are deposited separately at the pug mill location. Two new HD-16CB crawler tractors with 16000 diesel engines push this material to conveyors. The sand and gravel are mixed with water in a Boardman hopper, which is driven by a 16000 power unit. The hopper fills the trucks with the mixture, which is then dumped on the air field for use as runway base. Graders and rollers are used to complete the operation. An Allis-Chalmers HD-6 crawler tractor with a 344 diesel is used for cleanup work at the pug mill.

A 21000 Allis-Chalmers power unit drives the secondary crusher. The turbocharged 6 cylinder engine is rated 340 hp at 2000 rpm.

An Allis-Chalmers HD-16 tractor with 16000 engine pushes sand onto a conveyor at the pug mill.

The main $13.6 million contract for grading, drainage and construction of the runway and taxiway was awarded in 1958 to S. J. Groves & Sons Co., Minneapolis, Minn. Groves was awarded an additional $7.8 million contract in March 1959 for construction of an aircraft refueling system, a fuel tank farm addition, operation and access aprons, alert taxiways and support facilities. Using nearly 165 pieces of earthmoving equipment, much of it dieselized, Groves moved 8½ million cu. yd. of earth in one 15 week period during the summer of 1958. The bulk of the earthmoving has been completed. The array of dieselized equipment included scrapers, dump trucks, cranes, draglines, graders, bulldozers and rollers. This fleet was kept active by 60 Groves' mechanics and servicemen.

GIANT DESERT RIG



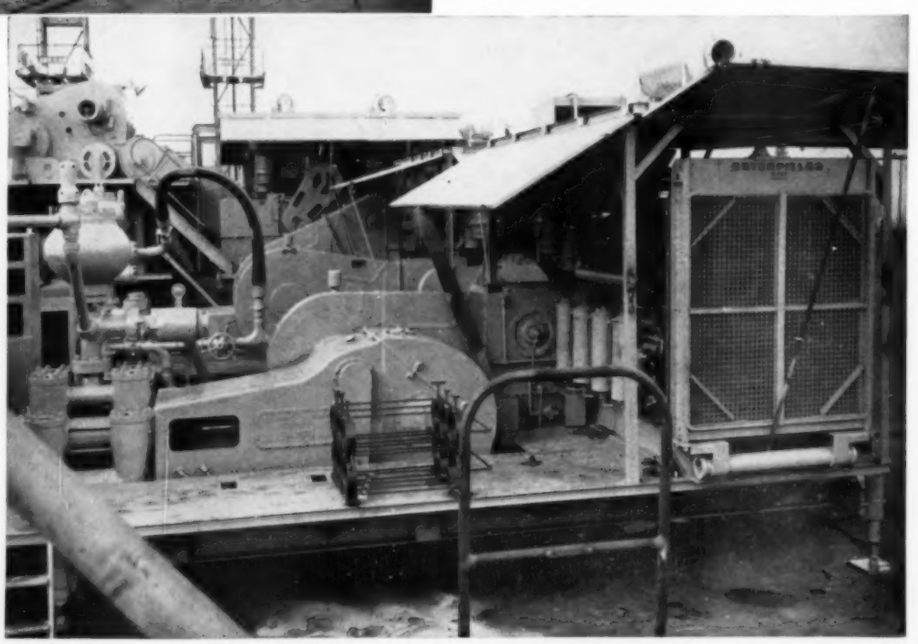
Wheel mounting of drawworks, mast, engines and pumps on five trailers and unitizing of pumps, manifolding and mud tanks reduce rig-up and moving time to a minimum with this Caterpillar-powered drilling rig.

CONSTRUCTION of a giant mobile drilling rig, the Desert Star No. 2, has been completed for Camdrill International, Inc., of Los Angeles. The rig was built by Ideco, Inc., at their Beaumont plant. It will be operating in the Libyan desert oil fields of North Africa.

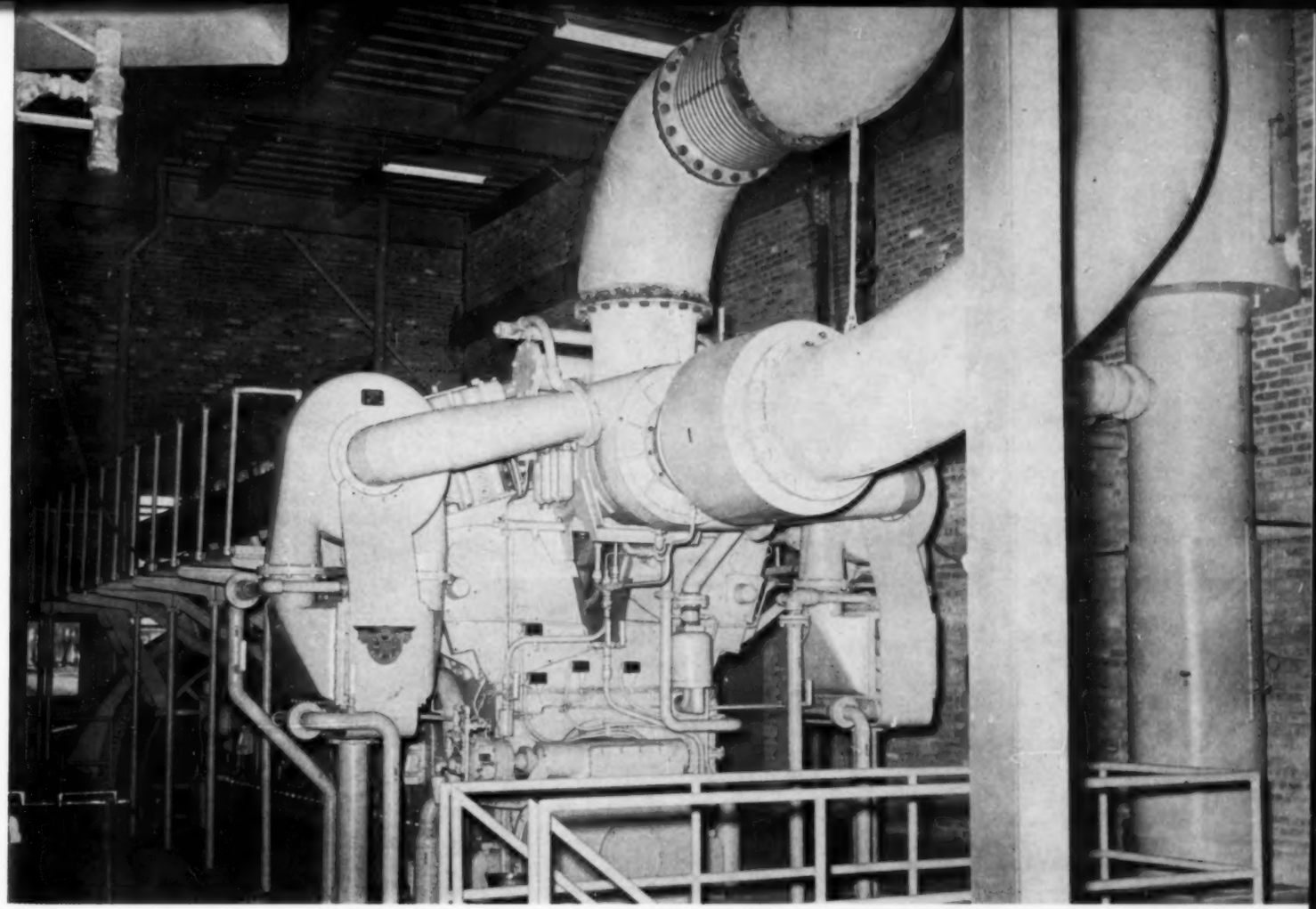
Major components of the huge rig are mounted on five semi-trailers which will be pulled over the desert by diesel trucks equipped with high flotation-type sand tires. The trailers travel on 24 huge 21:00 by 25 in. sand tires. William Mannon, Camdrill vice-president reported the rig will be one of the largest and most completely unitized trailer-mounted drilling rigs in operation anywhere. "It has a capacity for drilling to depths of 10,000 ft. and can be moved as far as 1200 to 1400 mi. over the desert without roads," states Mannon. The Ideco Desert Rambler will become an integral part of an extensive exploration program for the Oasis Oil Co., of Libya.

Two 375 hp Caterpillar D397 diesel engines power the draw works through a two-engine, three-shaft-in-line compound. An Emsco D300 slush pump is driven by another Cat D397, and the assembly is mounted on a separate trailer. On another trailer, an Ideco 600 slush pump receives power from both an additional D397 and through a propellor shaft drive from the drawworks compound. The Cat engines are equipped with new type Clark 24 in. convertors for smooth transmission of power. All engines have oversize radiators, dual air cleaners and dual fuel filters. Special crude oil filters enable these units to burn low grade diesel fuel or crude oil, whichever is available at drilling sites.

The rig's five semitrailers include the drawworks trailers, mast trailer, two heavy-duty pump trailers and a heavy duty utility trailer. An Ideco 127 ft. Dualift trailer-mounted drilling mast is mounted on the mast trailer. Hook load capacity of the mast is 300,000 lbs. with an eight line string up. The mast has a capacity of 12,960 ft. of 4½ in. drill pipe. An Ideco H-525-D double-drum drilling and workover hoist is mounted on the drawworks trailers. The mud system, excepting the mud tanks, is completely wheel-mounted on two trailers equipped with tandem 30 ton bogie units. The mud manifolding system is completely built into the pump trailers to reduce rig-up time and to increase independence of the rig. Two Caterpillar D339 65 kw electric sets are mounted on the utility trailer to provide power for auxiliary equipment and lighting. Power for the base drilling camp site is furnished by two Caterpillar D342 electric sets, each producing 100 kw.



Four Caterpillar D397 diesel engines, rated 375 hp, drive the drawworks and slush pumps shown here. Two Cat D339 65 kw and a pair of D342 100 kw sets provide electric power for the rig and drilling camp site.



Princeton's new Cooper-Bessemer LSV-16-GDT dual-fuel engine, installed in 1958, is 4 cycle, 16 cylinder, turbocharged and turbocooled with a rating of 4205 hp at 327 rpm. Engine drives a 3000 kw Elliott generator. Note jacket water cooler standpipe at right. Engine is equipped with a Woodward governor, Air-Maze air filters and Young after-coolers.

PRINCETON'S TWO LSV-16'S

Illinois Town Placed 3600 HP Cooper-Bessemer Unit on Line With Steam Turbines in 1952, Then Followed in 1958 with the Installation of a 4205 HP Diesel

PRINCETON, Illinois is a healthy city of 6500 persons in the heart of prosperous northcentral Illinois corn country. Princeton has a very fine municipally owned power plant, which recently added to its capacity a new Cooper-Bessemer 4205 hp dual fuel engine driving an Elliott 3000 kw generator. According to Jim Moran, superintendent of water and light since 1957 and a veteran of 31 years in the department, Princeton's population growth is apace with the national rate. Production figures of the power plant indicate this growth. Production in fiscal 1958, ending April 30, 1959, was 17,199,000 kwhs with a peak of 3650 kw. This was up from 16,117,000 kwhs and a 3350 kw peak in 1957 and represents a considerable increase over the 1953 production of 12,946,000 kwhs and a peak of 3000 kw. Hot August of 1959 had sent the peak demand to 4100 kw.

Operation of the electric department is profitable; income of $52,815.62 was recorded for the fiscal year ending April 30, 1958. Rates for electricity are comparable to those of the major electric utility, Moran said. Princeton's is a combination diesel and steam turbine plant with a total installed capacity of 8250 kw to serve 3200 accounts. Biggest units in the plant are two Cooper-Bessemer LSV-16-GDT vee type 16 cylinder turbocharged dual-fuel engines, both of which have 15¼ in. x 22 in. bore and stroke.

The first engine, rated 3600 hp at 327 rpm, had logged 24,528 hrs. since its installation in the late Fall of 1952 until mid-August 1959. This engine drives a 2500 kw Elliott generator. It was joined in May, 1958 by the second LSV-16-GDT, which had operated 8236 through mid-August, 1959. Turbocharged and turbocooled with the latest Cooper-Bessemer Supercharging system this unit is rated 4205 hp at 327 rpm and drives a 3000 kw Elliott generator. Before 1952, Princeton had relied on low pressure steam turbines—a 1250 kw unit installed in 1938 and a 1500 kw unit installed in 1946. Guaranteed supplies of natural gas are available in Princeton on a contractural basis only in spring, summer and fall. Supplies may be limited

or completely shut off during the winter months. When full quantities are available, the new engine is the plant's principal prime mover, backed by the older LSV-16-GDT and the steam turbines. This engine runs on straight fuel oil for these short-term peaking operations. "We can put it on the line in about three minutes," Moran said.

With gas in short supply, or non-existant, the versatile LSV-16-GDT's are switched to straight No. 2 diesel fuel service for peaking. Small injector tips are left on the newer unit and larger tips are used on the original engine, allowing it to go to full load on straight diesel fuel during the winter period. The fuel enters the engines at a pressure of 17 lbs. per sq. in.

When DIESEL AND GAS ENGINE PROGRESS visited the Princeton plant in August for the second time in five years (see March 1955 issue), the new engine had been running about 60 consecutive days without stopping. "Sometimes it runs three or four consecutive months before it is stopped for a change of fuel oil filters," Superintendent Moran reported.

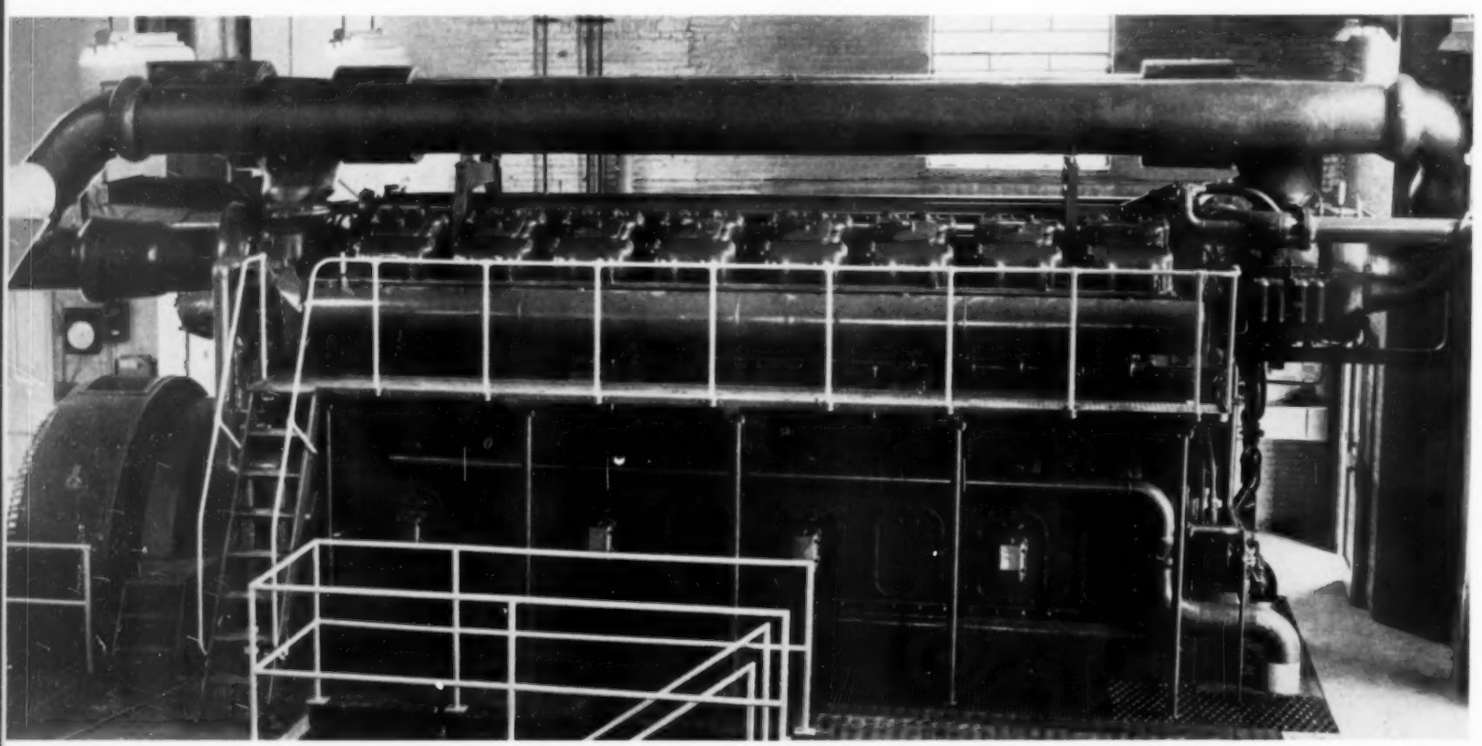
Moran calculates that production cost of the two dual-fuel engines in fiscal 1958 was 4.6 mills per kwh; fuel oil cost was 7.3 mills per kwh. Gas consumption was 10.3 cu. ft. per kwh produced; straight fuel oil consumption was a good 14.99 kwh per gal. Fuel oil is purchased for about 10.5¢ per gal.; lube oil, 69¢ per gal.; and natural gas, ranging from 33 to 50¢ per mcf. Moran stated that both of the LSV-16-GDT's have had outstanding maintenance records. "I've never had the heads off," he explained. "There's been no overhaul on either engine; neither shows signs of blow-by or leakage. We regularly check shaft alignments and make other maintenance checks."

The two LSV-16-GDT's are both 4 cycle, 16 cylinder, vee type engines but the new engine is rated 4205 hp—and 500 kw higher than the earlier unit. Accounting for this increase are a single high efficiency turbocharger and two turbocoolers—one for each bank—mounted on the end opposite the generator. In this system air entering the high pressure turbocharger is compressed by the exhaust driven centrifugal blower. Then it is directed to a booster in the turbocooler for another stage of compression. A shell and tube heat exchanger between the compressor and turbine of the turbocooler cools the air before it enters the turbo-expander. The heat exchanger tower and radiator are located on the roof of the plant. Water lines have been installed so that if the engine must be shut down in cold weather radiator water can be drained into a basement sump to prevent it from freezing and damaging the radiator.

The older engine has two turbochargers, one at each end of the engine. Both engines have a pneumatic control system and desired control pressure is obtained by running starting air through a pressure reducer. Design of the system permits the governor to control the various devices regulating engine operation. A control-air valve, operated by linkage from the governor, meters the air to actuators which, in turn, regulate the manifold air pressure and variable timing fuel shafts. In case of high water temperature, low lube oil pressure and engine overspeed, another portion of the control system is used to operate safety device to stop the engines. Once the system is in operation, the engines can be controlled from the control panels.

The engines have an identical, but separate lube oil system. A lube oil sump in the base of the engine provides suction for the pump, which is protected by a suction strainer. After going through a heat exchanger from the pump, the oil passes through a full flow filter, then a strainer, returning to the engine lube oil header flange. A valve in the raw water line controls lube oil temperature.

A jacket water standpipe, jacket water pump, heat exchanger and three way temperature control valve comprise the No. 1 engine's jacket water system. The engine water outlet is connected to



Princeton's first dual-fuel LSV-16-GDT turbocharged engine and rated 3600 hp at 327 rpm, has logged nearly 25,000 hours since its installation in 1953. It drives a 2500 kw Elliott generator.

Princeton's municipal utilities building was rebuilt in 1947.

the standpipe and the engine inlet is connected to the temperature control valve. Cooling water is provided by the steam turbine water treatment unit. Two aftercoolers cool the combustion air from the turbochargers. Air intake filters and exhaust snubbers are mounted on top of the building. The change from dual-fuel to diesel operation of the engines is automatic, with manual operation necessary to change from diesel to dual-fuel operation. Accessory equipment for the engines is located on a lower level. Plant fuel consumption for fiscal 1958 was: gas, 85,199,000 cu. ft.; fuel oil, 174,197 gals.; and lube oil, 865 gals.

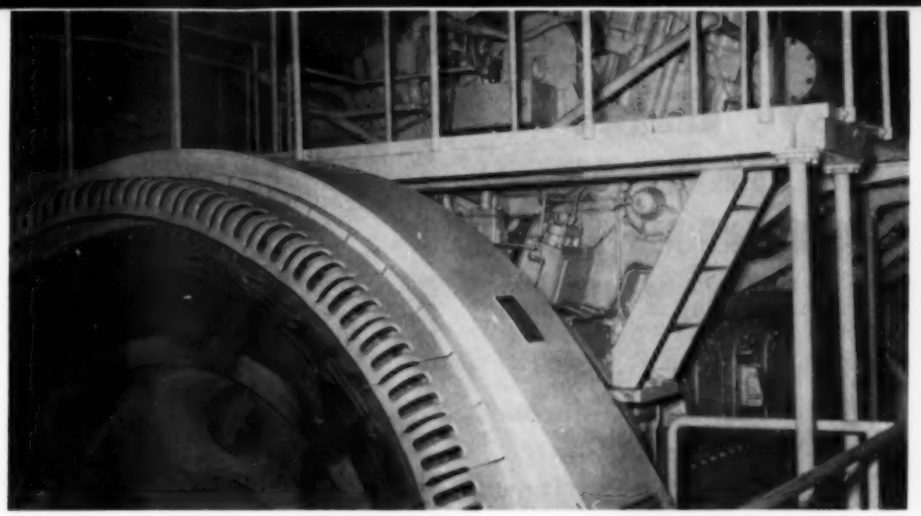
Measuring 140 x 130 ft., the power plant was completely renovated in 1947 and given a new brick facing. Located on one of Princeton's main streets, the plant neatly handles its array of equipment. Still in place, but inoperative since 1953 and disconnected, is an old 410 kw diesel engine. Consulting engineer for the installation of the new Cooper-Bessemer engine was Arthur W. Nelson & Associates, Inc. Chicago.

A 150 kw Cummins NRT-6 emergency diesel engine is located in a building 75 ft. to the north of the power plant. Tied into the secondary of station power transformers, this engine feeds to the necessary lube pumps to start the main engines in case a power failure cuts off current to those units.

In addition to Moran and Joe Lawes, his chief operator, others involved in the operation of the Princeton power plant are Mayor Roy P. Rheeling, who also is commissioner of public affairs, and Daniel D. Russell, commissioner of public property for the city.

Principal Equipment Serving Two Cooper-Bessemer Engines

Generators	Elliott
Governors	Woodward
Fuel oil	Sinclair
Fuel pumps	Weinman, Roper
Fuel filters	CFC Fulflo
Air filters	Air-Maze, American
Aftercoolers	Young
Lubricating Oil	Sinclair
Lube pumps	DeLaval
Lube coolers	Ross



View of the new Cooper-Bessemer engine with 3000 kw Elliott generator in foreground.

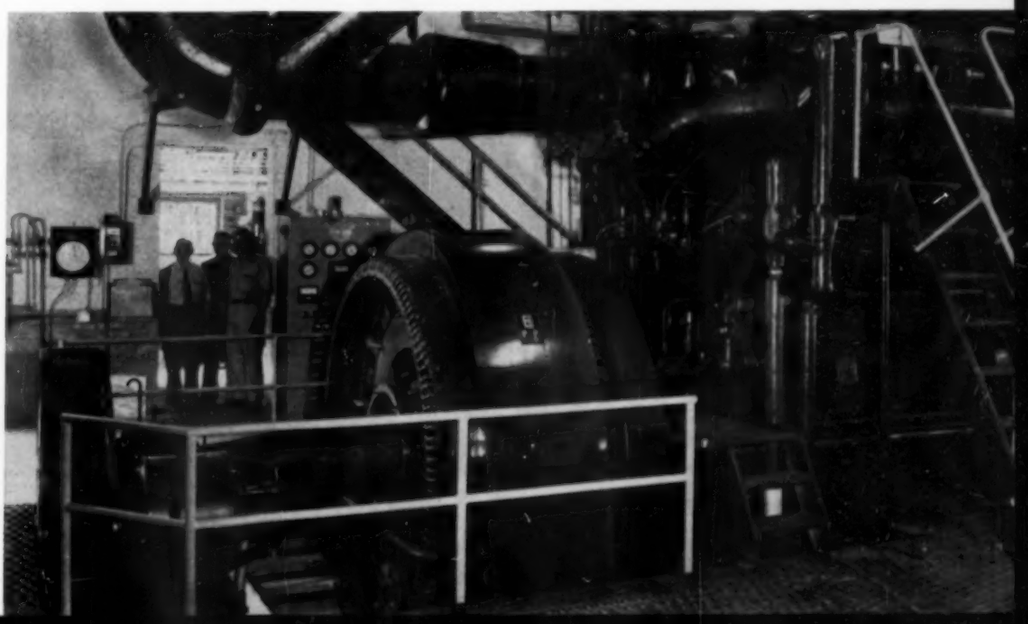
Panel board for No. 2 engine.

Jacket water pumps	Allis-Chalmers
Exhaust silencers	Burgess-Manning
Starting air compressors	Quincy
Piston rings	Koppers
Control panels	Cooper-Bessemer
Alarms	Mercoid
Thermometers	Taylor
Cooling tower	Dover
Shut down control	Fulton-Sylphon
Nozzles	American-Bosch
Regulating valve	Amot

Princeton Power Growth

YEAR	KWHS	PEAK KW
1953	12,946,000	3000
1954	13,836,000	3050
1955	14,635,000	3300
1956	15,063,000	3300
1957	16,117,000	3350
1958	17,199,000	3650
1959	——	4100

Looking at the No. 2 engine are Jim Moran (right), superintendent of Princeton's Water and Light Department, and J. E. Everson, retired former superintendent.



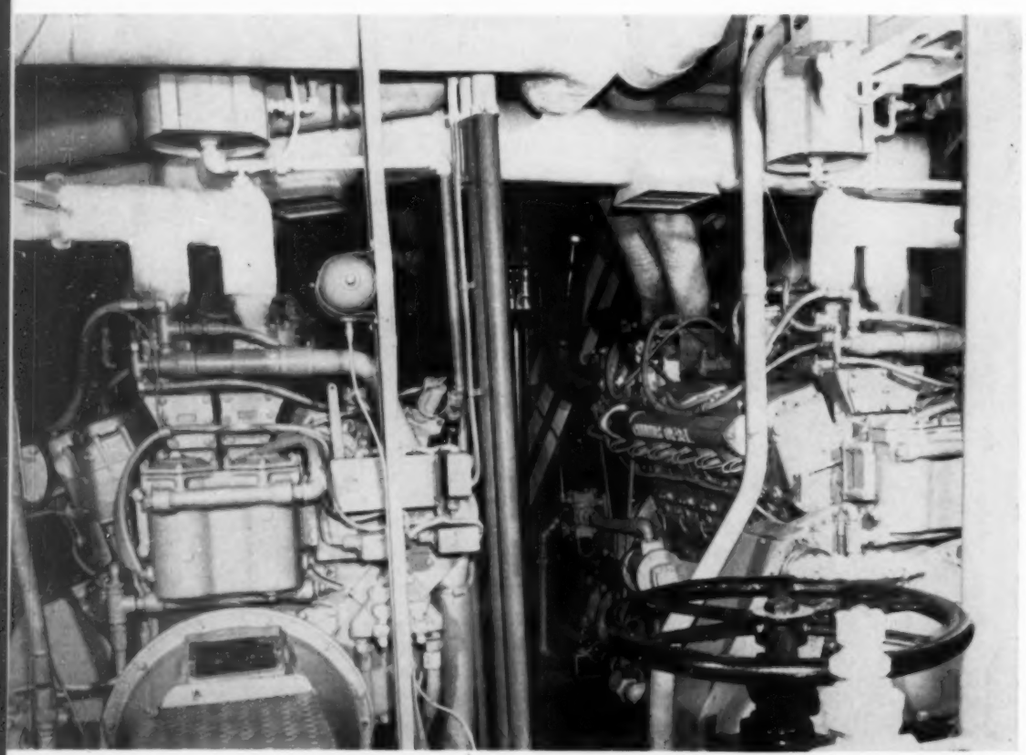
NEW DIESEL FIREBOAT PROTECTS MAINE PORT

Two 12 Cylinder Cummins Engines Propel *City Of Portland:* Its Capacity Is 7000 GPM

By W. L. BODE

FIREBOAT protection for Portland, Me., is being provided by the new dieselized *City of Portland*, a 65 ft. 10½ in. long vessel designed by John G. Alden & Co., Inc., Boston, Mass., and built by General Ship & Engine Works, East Boston. The hull and deck house were constructed by Gladding-Hearn Shipbuilding Corp., Somerset, Mass. The new *City of Portland*, with 18 ft. 6 in. beam and a draft of 5 ft. 11 in., succeeds another boat of the same name, built by Alden in 1930.

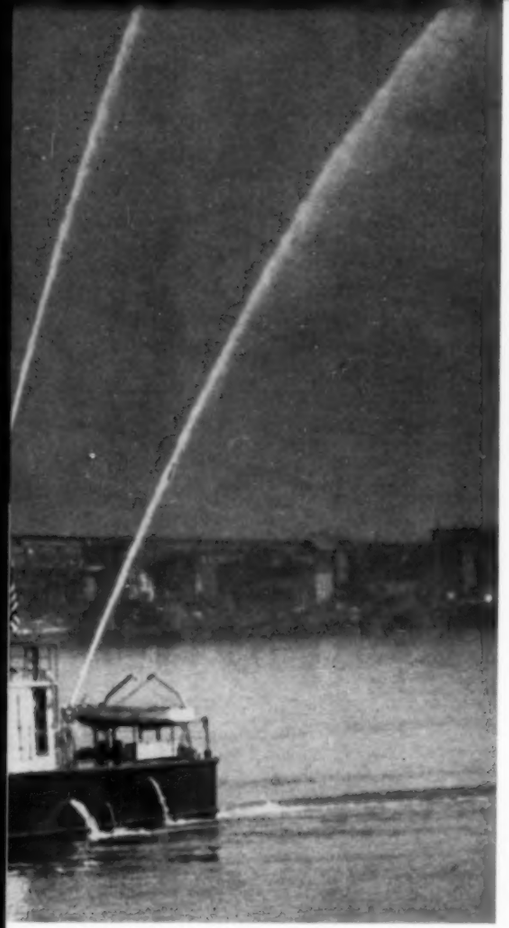
Features of the new twin screw boat, according to the architects, include high output, versatile operation, remote control and low operational and initial cost. It has a continuous capacity of 7000 gpm at 150 psi. In having the boat built at a cost of less than $37 per gal. capacity, Fire Chief Carl P. Johnson reasoned that the boat could pay for itself in less than 10 years out of operational cost savings and, at the same time, upgrade Portland's waterfront fire-fighting facilities. The vessel can be operated with a three-man crew per shift, four less men per shift than for the old *City of Portland*. The vessel has complete crew quarters with berths, locker, shower and a well-equipped galley.



Main propulsion is provided by two Cummins VT-12-M diesel engines with Snow Nabstedt reverse and reduction gears. The VT-12-M's, with 5⅛ in. bore and 6 in. stroke, are rated 390 cont. hp at 1800 rpm. for pumping and have an intermittent 2 hour rating of 560 hp for maximum propulsion for speeding to a fire or rescue mission on the islands of Casco Bay. The vessel can maneuver and operate on twin screws and concurrently pump full capacity. This is accomplished through use of two auxiliary Cummins JN-6-M diesels working through a unique "Y" drive gear box. All engine starting, clutching, speed control and transfer from main to auxiliary and main propulsion to main pumping is accomplished in the wheel house by air control levers.

The *City of Portland's* mechanical foam system incorporates automatic control of foam liquid injection, variable percentage selection, individual selection of foam or water discharge and the use of nozzles that can deliver foam, fogfoam, waterfog or straight water streams. The $260,000 vessel

Main engines, Cummins VT-12-M, with Twin Disc front power take-offs used for driving fire pumps. Engines were supplied by Cummins Diesel of New England, Inc.



City Of Portland fireboat with all four monitors in use. Vessel has continuous capacity of 7000 gpm at 150 psi.

actually pumped 7400 gpm at 150 psi during its Fire Underwriters' tests. Because of machinery arrangement, this output is possible on a 24-hour continuous basis.

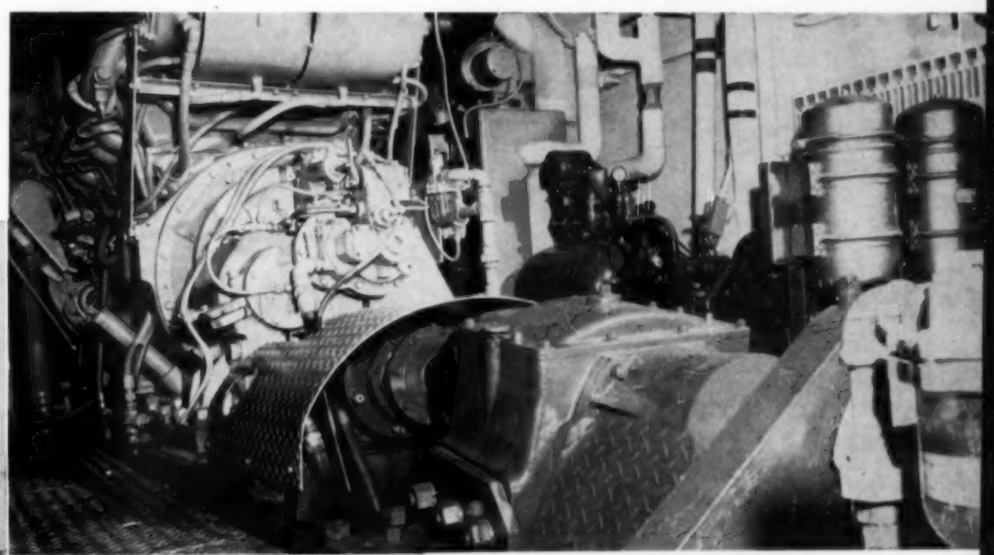
The foam liquid pump is driven by one of the main diesel engines through a power takeoff arrangement. This engine simultaneously drives one of the large water pumps and the foam liquid pump when the foam system is in use. Foam liquid proportioning is accomplished by a balanced pressure proportioning system which utilizes a centrifugal type foam liquid injection pump, a pressure control valve, two ratio flow controllers, a proportioning controller and percentage selection metering valves. The foam system can be placed into operation by engaging the foam liquid pump and setting the foam liquid percentage selector valves at the desired percentage. Pressure gages in the pilot house and in the engine room indicate balanced foam liquid and water pressures.

When operating in close quarters, the pilot house control system permits the *City of Portland* to turn 360° in its own length without sidewise movement. The shoal draft and short lengths allow the vessel to work in close to piers, dump fires and small boats in trouble. The remote controlled tower monitor can be positioned from inside the wheelhouse, affording protection of fireboat personnel from intense heat.

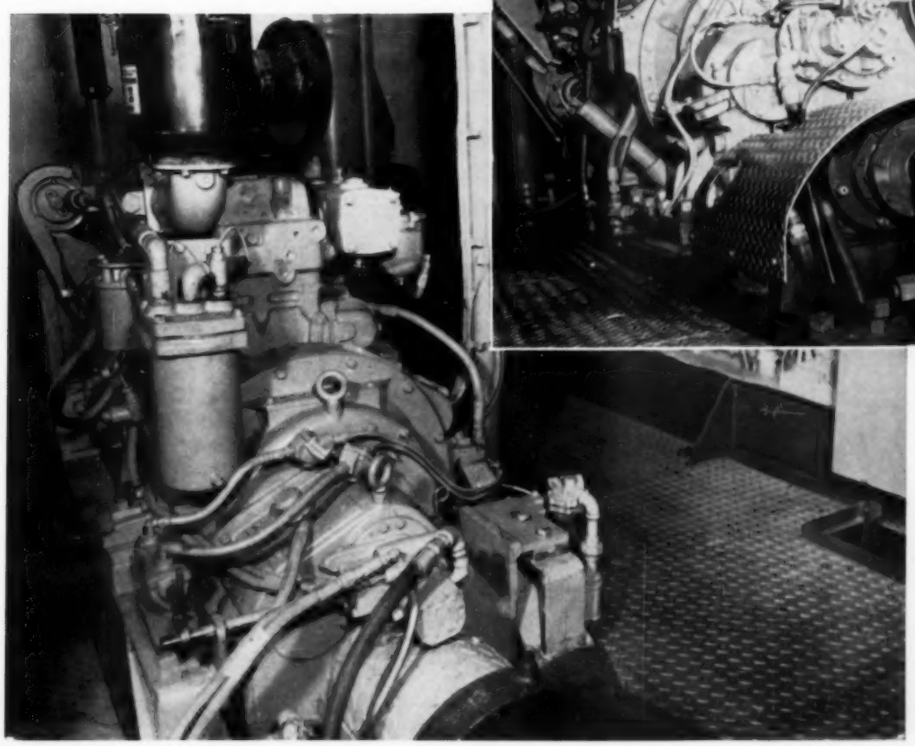
Philip L. Ross, vice president and principal naval architect of John G. Alden & Co., told DIESEL AND GAS ENGINE PROGRESS that the maneuverability of the *City of Portland* was "phenomenal." "We have been able to prove by actual demonstration," he said, "that with all the monitors going in different directions the boat can be maintained in an exact position with respect to a buoy or any fixed item for any amount of time without the boat moving. This is extremely important in fighting fires in a harbor with tide waves, heavy winds, and the thrust of the monitors to push a boat around when it is trying to hold its position." Ross said that his company was working on shoal draft and ice-breaking versions of the same basic boat as the *City of Portland*, which also is available as a basically standardized fireboat in 10,500 and 14,000 gpm capacities.

Principal Equipment

Engines	Cummins
Reverse & reduction gears	Snow-Nabstedt
V-drive	Walter
Pump drive	Twin-Disc
Auxiliary generators	Onan
Pneumatic controls	Westinghouse Air Brake
Silencers	Maxim
Compressor	Quincy
Lube oil filters	Luber-finer and Nugent
Fuel oil filters	Fram



Starboard main engine with Snow-Nabstedt 3961 gear and Walters V-drive. Note Luber-finer filter and Quincy starting air compressor.



Cummins JN-6-M auxiliary engine with Snow-Nabstedt 3941 gear and part of engine instrument panel.

PACKAGED COMPRESSORS BOOMING IN THE GAS FIELDS

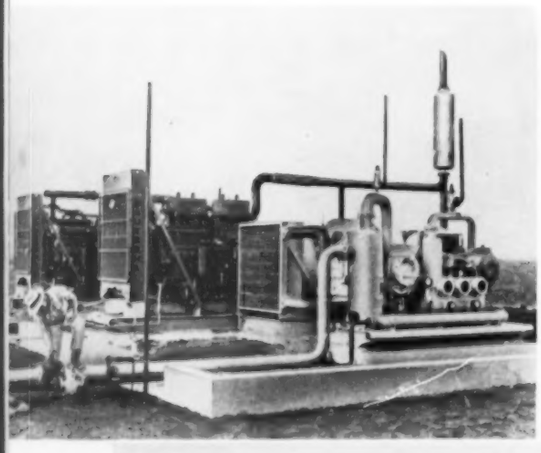
There's Good Reason. These Flexible, All-in-One Compressor Units Cost Less Than Fabricated Stationary Units: They Are 90 Per Cent Salvageable. Pre-packaged Units Range To 2000 HP and Greater

By DONALD M. TAYLOR

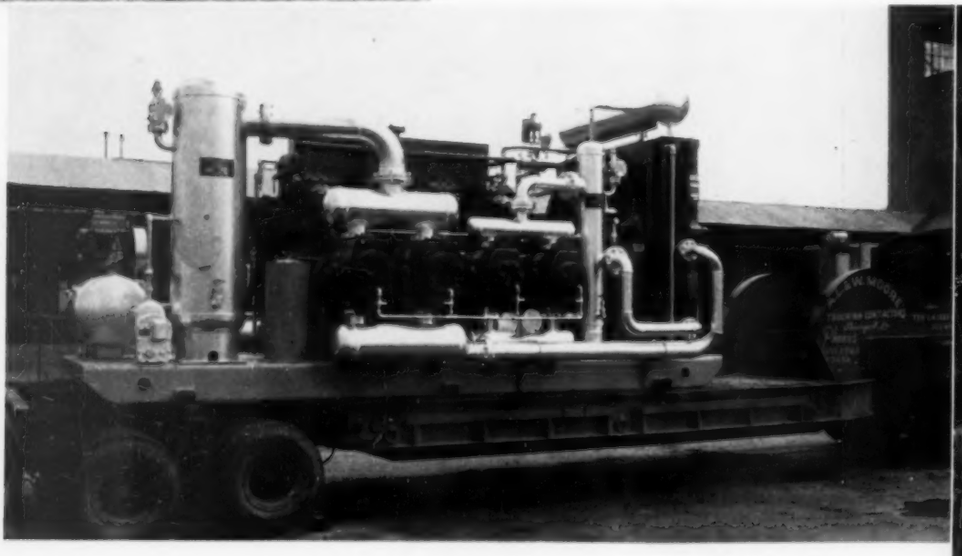
LAST summer a handful of men erected a 10,000 horsepower compressor station in a few days' time! If you've been around many compressor stations, you know this is quite a feat. Ordinarily, the engineering of a station of this size takes months; and the purchasing of nuts, bolts, flanges, engines, piping, cooling towers, etc. can become a prolonged project in itself. More often than not, construction will consume four to six months, depending on the weather; and overhead charges, insurance, etc., soar before the station goes on the line.

What's the explanation for this burst of speed? The answer is quite simple. The compressor units were prefabricated—complete with cooling systems, instrumentation, scrubbers, auxiliaries, etc., and skid-mounted for ease in handling. Workmen who erected the 10,000 hp station had only to pour a concrete slab, set the units on it and tie-in gas suction and discharge lines. Today, most engine manufacturers and many independent fabricators as well are producing the pre-packaged or prefabricated units. The reason? Pressures in gas fields are falling as the nation's consumption of natural gas continues to soar. As pressures diminish, more and more compressor horsepower is required to compress the gas to transmission line pressures. This has called for thousands of field booster stations which were, until recently, mainly field assembled. In the past few years, the pre-packaged units have moved to the front in supplying this growing market because of their many advantages.

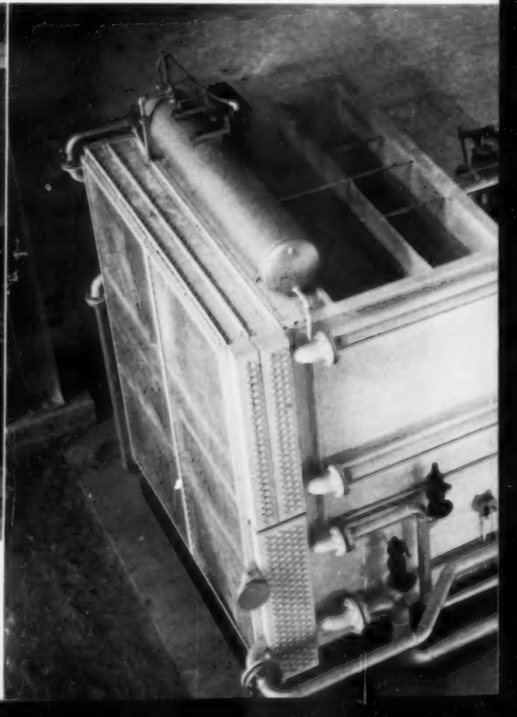
What are the advantages of the pre-packaged units? The most important ones are the low initial cost and the high salvage value. Installations of 400 or more horsepower cost $200 per horsepower or less—some 30 percent below the price of average field assembled units. Salvage value usually runs about 90 per cent where the units work themselves out of a job—rather than wear out. Summarized, the advantages of the pre-packaged units stack up like this: (1) They cost less than field-constructed stationary units; (2) They are better constructed; (3) They require only a concrete slab foundation—no large engine blocks, etc.; (4) They can be used over and over again; (5) They are flexible—it is practical to add them one or two at a time as the need in the field develops, and then remove them in the same manner as the field declines; (6) The units have a long life expectancy; and (7) Most of the pre-packaged compressor units are easily modified to suit field conditions—cylinder heads, for example, are easy to change. To better understand their gas field popularity, take a look at what happens during the normal depletion of a gas field. Newly discovered fields usually have plenty of pressure—more than enough to flow gas directly into a gas transmission pipe line. But as production continues—24 hours a day, 30 days a month, pressures start dropping. The first thing you know, the pipe line pressure is higher than the well-head pressure. Compressors must be installed—a few at first, many later on. Finally, the gas production drops to such an extent that it is impossible to produce sufficient quantity to keep the large battery of compressors operating. As the need for the

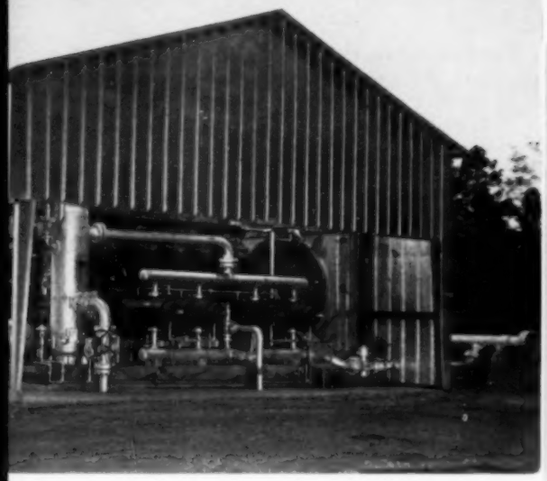


Waukesha model LRORBU 6 cylinder, 2894 cu. in. gas unit at the left and a model LRZBU 6 cylinder, 3520 cu. in. gas unit on the right driving two-stage Worthington compressor at Corpus Christi, Texas.



A skid-mounted 440 hp Ingersoll-Rand 4-cycle, V-angle SVG engine-compressor being transported on a truck. Note Young radiator.





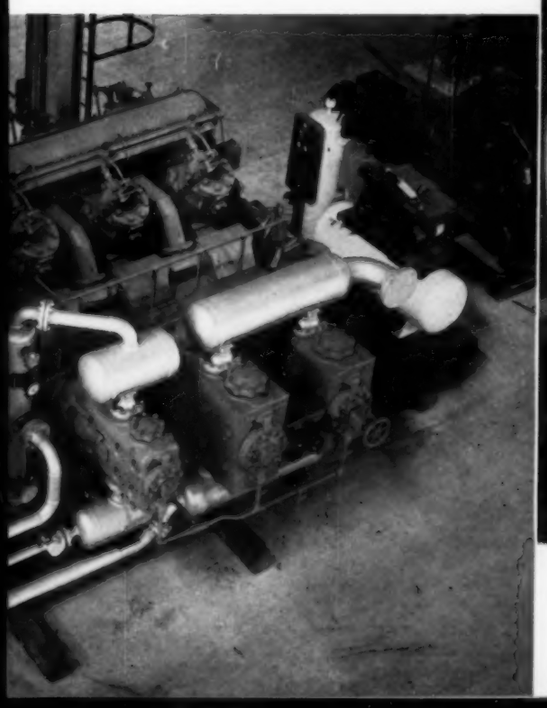
Natural Gas and Oil Company's Sligo field station—equipped with three Beaird-Ingersoll-Rand 10SVG 550 hp packaged compressors, Young Radiators with lubricating oil coolers, gas coolers and all necessary controls. This company has twice expanded this compressor station. Note American Cycoil air filters.

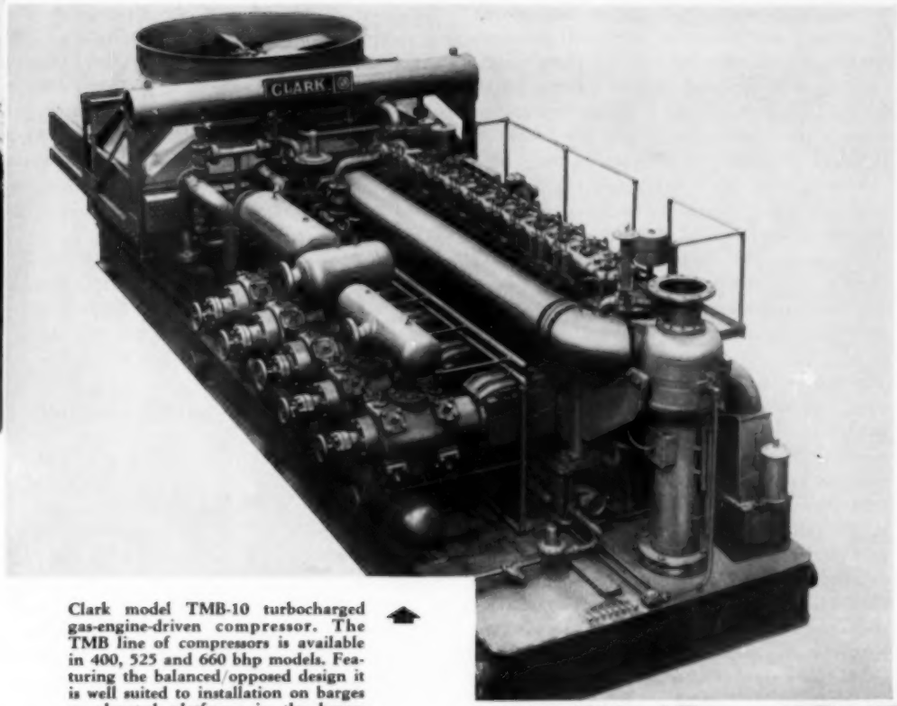
units diminishes, they can be moved elsewhere—the only loss is the gas piping and slab foundation.

How the Units Are Packaged

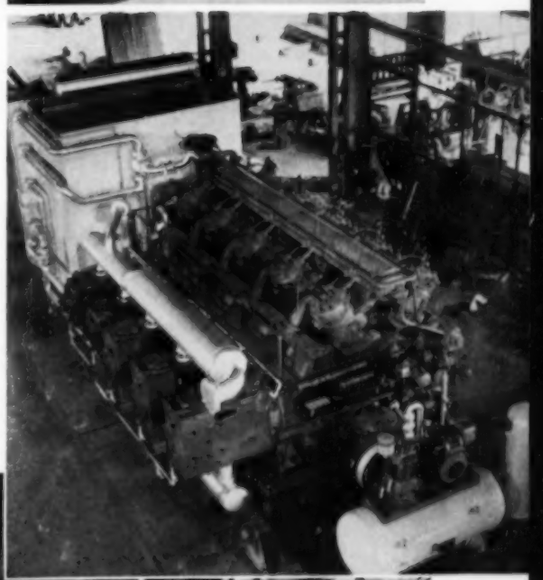
The packaged units are skid mounted with all necessary auxiliaries. They have from two to four gas scrubbers, depending on the number of compressor stages, and they are equipped with air-cooling sections for jacket water, lube oil and discharge or interstage gas. The jacket water pump is driven from the engine and the control panel, mounted on the skid with the engine, contains the

GMXD-6, 400 hp 2-stage gas engine compressor unit, completely packaged by Cooper-Bessemer's Houston Subsidiary, C-B Southern, Inc. for use in South Texas field. Field gas surge tank on right is furnished with Magnetrol high liquid level shutdown device. Unit is equipped with dual ignition for wet fuel operation. Note combination indicating shutdown panel and automatic speed control panel mounted on fuel gas surge tank.



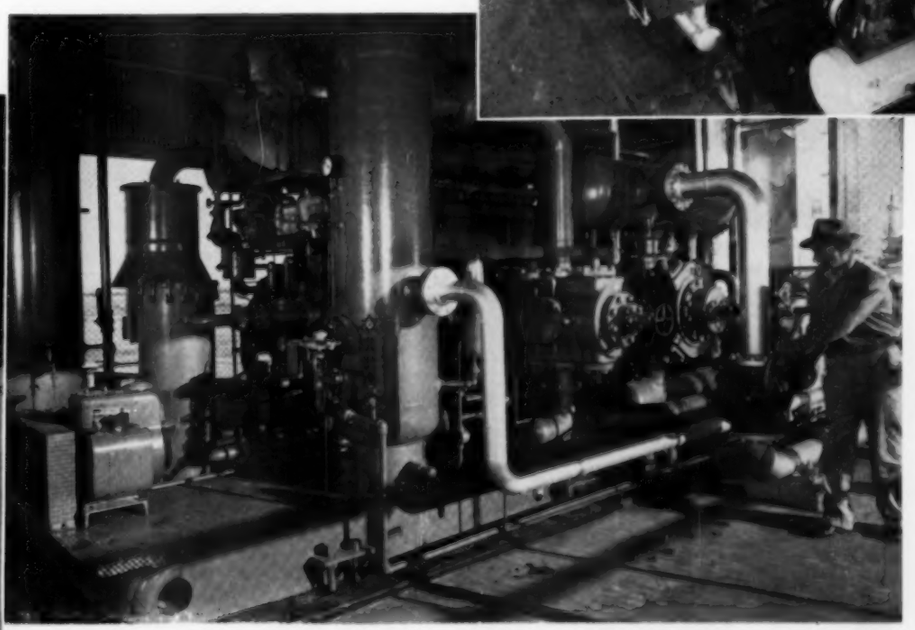


Clark model TMB-10 turbocharged gas-engine-driven compressor. The TMB line of compressors is available in 400, 525 and 660 bhp models. Featuring the balanced/opposed design it is well suited to installation on barges or elevated platforms in the bayou country of Louisiana or in offshore applications.



Cooper-Bessemer GMXD-10, 660 hp gas engine compressor unit, with gas piping arranged for 2-stage operation, 40 psi to 1000 psi. Cooler is designed to absorb 825 hp. This unit is completely packaged by C-B Southern, Inc. It is now installed on a concrete capped wooden pile platform over water and will later be transferred to a floating compressor barge in the south Louisiana area. Note Quincy compressor and Manzel lubricators.

One of the two Worthington SLHC-4 packaged units installed at Permian Basin Pipe line Co. near Jal, N.M. for gas gathering service. Permian is a wholly owned subsidiary of Northern Natural Gas Co. Unit is equipped with American Cycoil air filter.



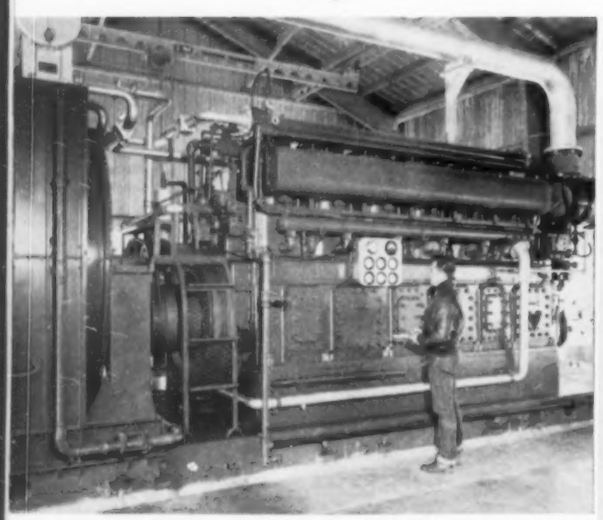
necessary shutdown controls for overheating, low oil pressure and overspeed. Additional shutdown controls are available for high gas temperatures, vibrating valve breakage, etc. It is a simple matter to install the packaged units. Throughout the gas industry, the installation cost will vary widely depending on whether or not the skid-mounted units are housed, etc. With just a few modifications, practically any of the units will withstand ordinary outdoor weather. Included in the erection cost are the price of the concrete slab foundation, hauling the packaged unit to the station site, bolting it down and tying suction and discharge lines to the field gathering system.

The cost of stationary field-fabricated units runs about $100 to $125 per horsepower—not including the cost of cooling units for gas and water, cost of water wells, engineering design, supervision, inspection, insurance and overhead. In addition to these direct charges, field warehousing is required for the supplies, heavy construction equipment is needed along with highly skilled labor. After the so-called stationary unit has been completed, it must be tested, cleaned and painted. Scrap left over must be salvaged or charged to the job. This runs the costs some 30 percent above packaged units. There are a number of variables which affect the cost of the packaged compressor units. The horsepower, the number and size of cylinders, the pressure of the gas, and locality all affect the price. But even the most expensive packaged unit installed on its foundation and in operation is still cheaper than a field fabricated installation. When DIESEL AND GAS ENGINE PROGRESS surveyed the industry on total installation costs, the results showed that cost of packaged units completed and installed ran as follows:

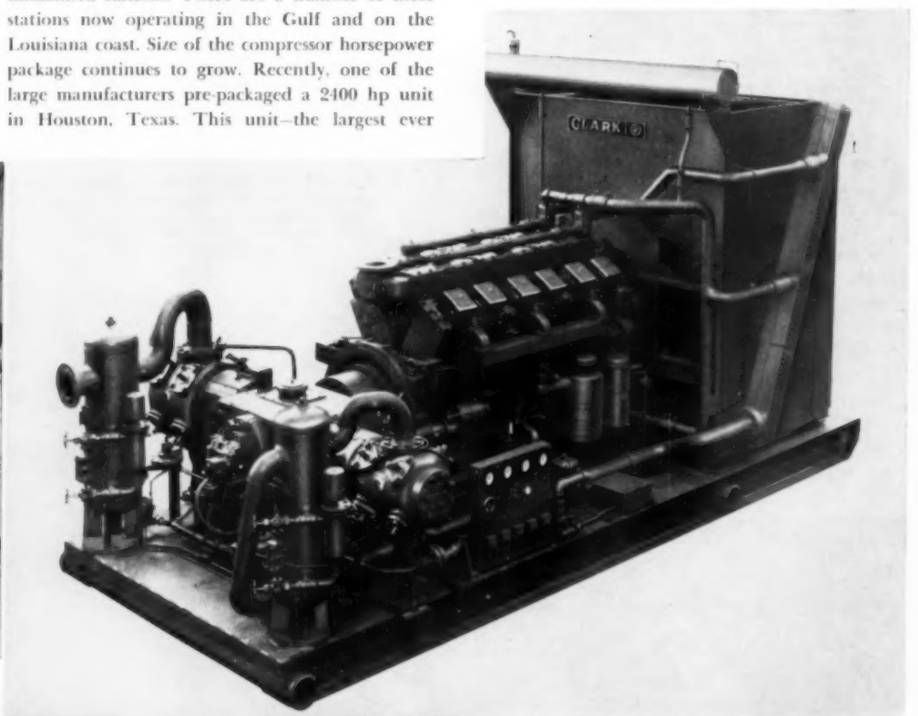
240 hp	$260-300/Bhp
330 hp	$265-270/Bhp
440 hp	$220-255/Bhp
550 hp	$205-225/Bhp
660 hp	$195-218/Bhp

Bright Future for the Packaged Units

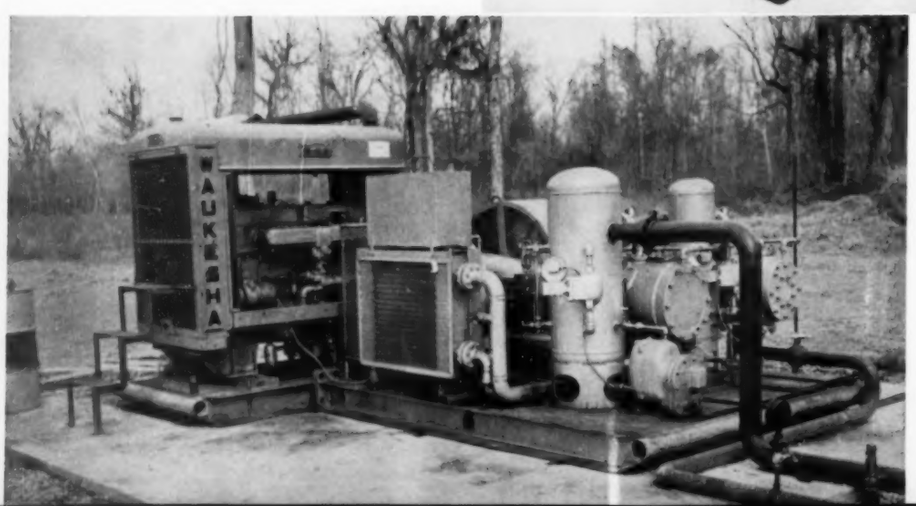
Every year our country is using more natural gas. This means that every year more and more of these packaged units will be fabricated. As gas reserves are developed in the Gulf of Mexico, in the Pacific Ocean off the California Coast and in Lake Erie the compact packaged compressors will find a ready market. The cost of platforms runs about $70 per square foot in parts of the Gulf, and the less space occupied by compressing equipment, the better. Because the packaged unit is so well suited to remote operations, it is finding widespread use in unmanned stations. There are a number of these stations now operating in the Gulf and on the Louisiana coast. Size of the compressor horsepower package continues to grow. Recently, one of the large manufacturers pre-packaged a 2400 hp unit in Houston, Texas. This unit—the largest ever packaged—was disassembled before shipping, however, and required a certain amount of field assembly. Quite likely, more and more pre-packaging in the higher horsepower ranges can be expected, but it is doubtful that many will approach the 2400 hp size. Most engine men predict that the demand for packaged units will continue to grow as gas field pressures fall. They point out that the all-in-one units enable operators to be more liberal with their use of compressors in the field. Aside from costing less the shop-built units can be added or subtracted as estimates of field reserves are adjusted with production. Perhaps the biggest savings of all may come through laying smaller pipe line gathering systems. What with compressor horsepower costing less and with the units highly salvageable, it is practical to install more than normally adequate horsepower in order to save on pipe line installation. It now costs about $2300 per dia. in. per mile to lay pipe lines in average gas fields. For this reason, any reduction in diameter of a system—which can come through running higher gas pressures in the lines—can result in substantial savings. Because of these advantages, you'll be seeing great growth in the already booming packaged compressor business. In addition, you'll be seeing more and more large engines taking a turn around the "assembly line" before shipment.



Worthington SLHC-6 skid mounted 575 hp gas-engine compressor unit installed at Southern Natural Gas station in Whitecastle, La.; for gas transmission service. Unit has Young radiator.



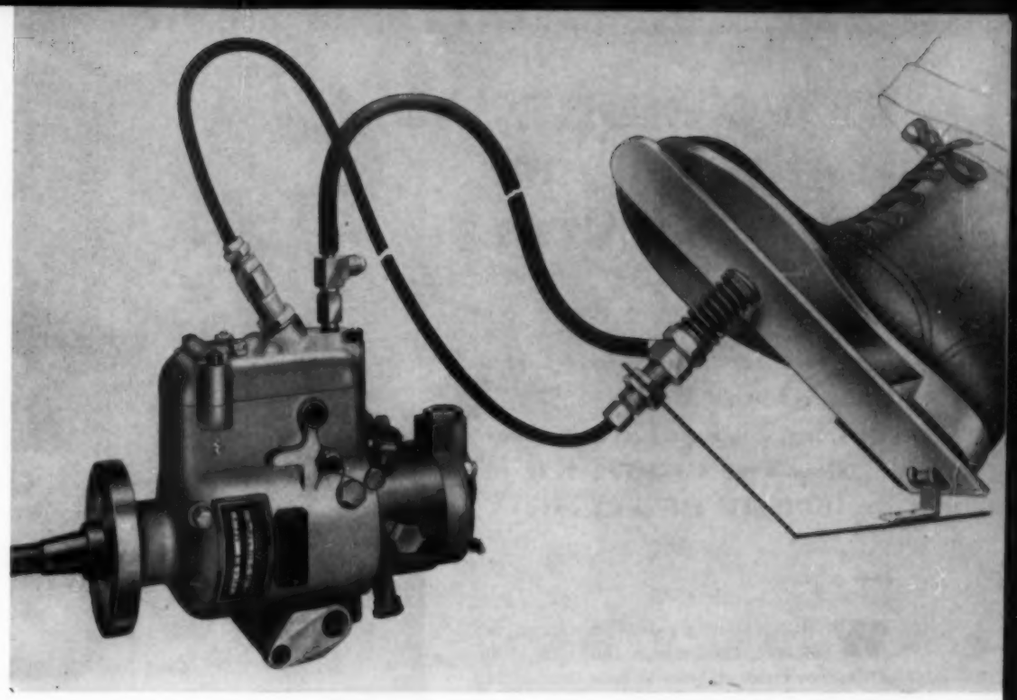
Clark 350 bhp model CFB packaged compressor station. This unit features balanced/opposed compressor design and direct coupling to a 1000 rpm Climax oil field type engines. Note Winslow lube oil filter and Vortox air cleaner.



A Waukesha model WAKU 6 cylinder, 1197 cu. in. gas unit on a Gardner Denver compressor in southwest Texas.

HYDRAULIC THROTTLE CONTROL

New Hartford Machine Screw Co. Product Has a Wide Application; Features Design Simplicity



Drawing of new throttle control. Sending unit is mounted on vehicle floorboard. Pressure line connects sender actuated by foot pedal and receiver mounted in fuel pump housing cover. Bleeder line runs between sender and receiver.

A NEW hydraulic throttle control that should find many applications in automotive on and off-highway equipment as well as in agricultural and industrial service is announced by the Fuel Injection Division of Hartford Machine Screw Co. In development for some time and now thoroughly tested, the new control is unique, yet relatively simple in its design concept. It is built for use with all Roosa Master model D and DB pumps and consists primarily of two hydraulic units—a sender installed under and depressed by the foot accelerator, and a receiver mounted in the fuel pump housing cover. Pressure exerted on the piston in the sender is transmitted through a nylon tube to the receiver whose piston responds by moving the throttle control in the pump governor. Hydraulic medium in the control system is filtered fuel from the pump housing.

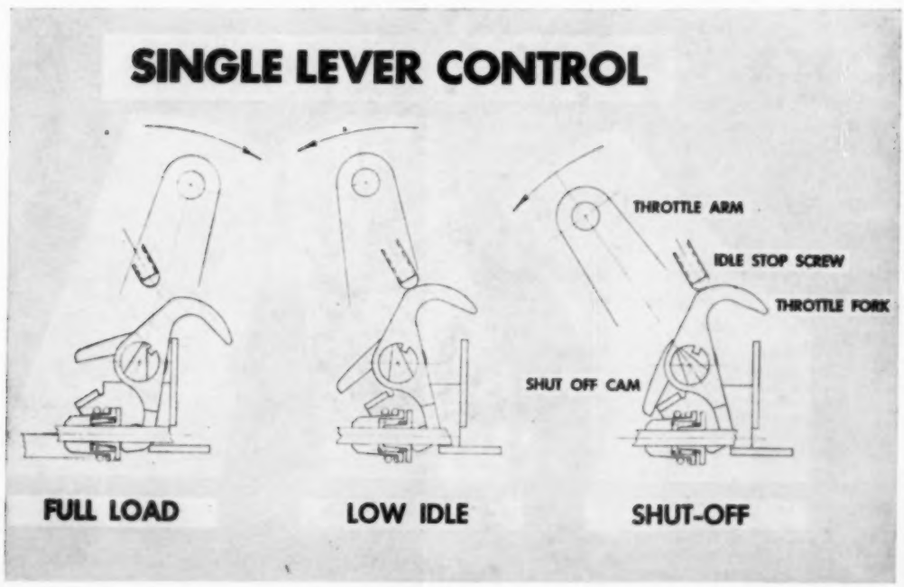
Commenting on the new unit, Vernon Roosa, director of research for Hartford's Fuel Injection Division, stated that it was developed to provide a single, universal control for all equipment with Roosa Master pumps—a control which would eliminate the multiplicity of linkages and levers required for so many different types of applications. Without mechanical linkages, the control will also eliminate throttle fluctuations in off-highway equipment caused by shifting of engines on their mountings in rough terrain. Commenting further, Roosa pointed to the sound application of the system in installations where control linkage is either long or complicated such as in buses or trucks of COE design. The fact that all external moving parts have been eliminated and that no internal adjustments are required should measurably reduce maintenance in this area.

Drivers testing the unit respond favorably to its "touch"—a prime area of design concentration by Hartford. The sender actually provides for two-stage acceleration. In the initial stage, a small plunger working within the main piston exerts pressure in the system. At this stage the ratio of pedal travel to pressure is about 3:1 which magnifies the sensitivity of the pedal for small speed changes. This soft pedal feel is ideal for creeping, jockeying and low gear maneuvering at engine speeds up to approximately 1200 rpm. As the plunger reaches its full length of travel, it engages and actuates the main piston and the second stage of acceleration begins for normal and higher speeds.

The drawing of the system shown on this page is indicative of its simplicity. The sending unit is normally mounted on the floor board approximately one-third way up the pedal. In addition to the pressure line, a bleeder line also runs between the sender and receiver and each of these units is equipped with a check valve. With the engine running and no pressure on the pedal, these check valves open and allow regular fuel oil to flow through the system thus purging it of any entrapped air. When pressure is exerted on the pedal, the valves close, shutting off the bleeder line and allowing positive pressure to be transmitted to the receiver piston. Piston travel is limited by fixed stops making speed repeatability constant.

Conversion of the model D pump to the new throttle control is simple and requires only removing the external levers and throttle shaft, plus replacing the original pump cover with one incorporating the receiver unit. Production tooling for this new control has been completed and field testing for standard or optional use on several makes of trucks are underway. Conversion kits for field replacement will also be made available.

Schematic drawing showing control in full load, low idle and shutoff positions. Pressure on the piston in the sending unit is transmitted to receiver unit whose piston moves the throttle control in pump governor.



TWO MORE DRAVO 3200 TOWBOATS

New Pair Was Built For Chotin and Berwick Bay Towing Firms: Each Vessel Has Two 16-567C GM 1600 HP Diesel Units

WHILE a proud grandmother watched, two of her granddaughters christened identical modern diesel towboats in New Orleans, La., September 23. The grandmother was Mrs. Irene Chotin, wife of Capt. Joseph Chotin of New Orleans. Her namesake, 16-year-old Patricia Irene Chotin, smashed the traditional bottle of champagne on the capstan of the 3200 hp *Irene Chotin*. Patricia's sister, 12-year-old Joey Scott Chotin, performed the same ceremony for the boat which bears her name, the *Joey Chotin*. Both Patricia and Joey are daughters of Capt. Scott Chotin.

The *Irene Chotin* is owned by Chotin Towing Corp.; the *Joey Chotin* by Berwick Bay Towing Co. Capt. Joseph Chotin is president and Capt. Scott Chotin is secretary of both firms. Both boats are of the Dravo 3200 class, the fourth and fifth completed by Dravo Corp., Pittsburgh, Pa., under the firm's stock towboat construction program. The Chotin companies are utilizing the new vessels to push high-speed petroleum tows on the inland waterways. An earlier *Irene Chotin*, a 2400 hp towboat formerly owned by Chotin Towing Corp., was sold to Sioux City & New Orleans Barge Lines, Houston, Texas, and renamed the *Nebraska City*.

Powered by twin GM Cleveland diesel marine engines equipped with reverse reduction gear, the new *Irene Chotin* and the *Joey Chotin* are 3200 hp craft. They are 148 ft. long, 34 ft. wide and 10 ft. 6 in. deep. Each of the model 16-567C diesel engines delivers 1600 cont. hp at a propeller speed of 212 rpm. Engines and reverse reduction gears are amidships in the hull on an integral base.

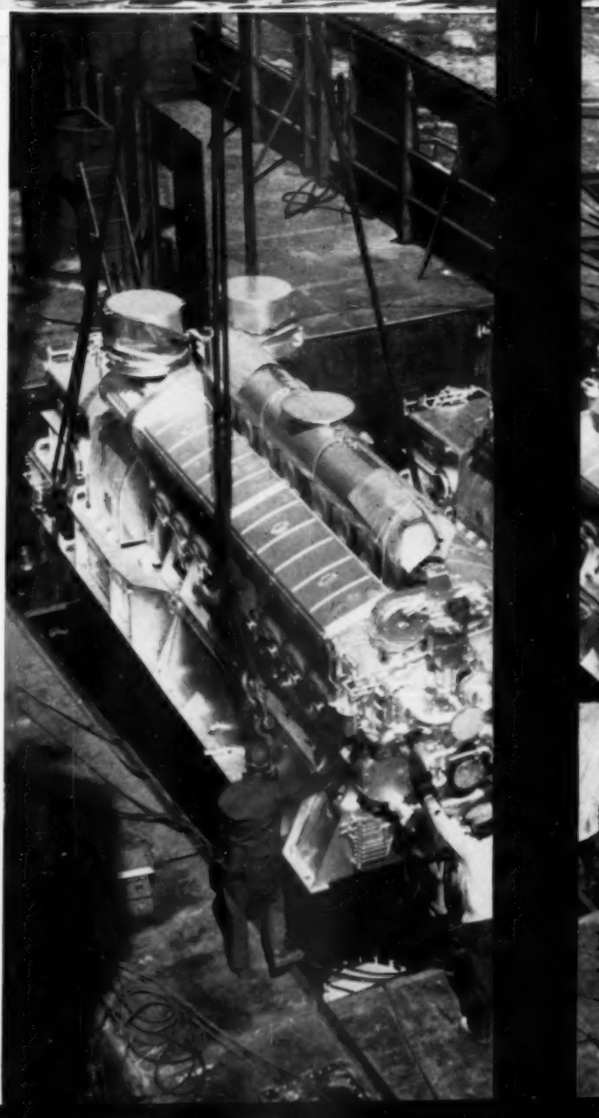
The *Irene Chotin* shown during her trial run on the Ohio river below Pittsburgh, is owned by the Chotin Towing Corp. The *Joey Chotin* is owned by the Berwick Bay Towing Co. Both are Louisiana firms.

The two boats are fully equipped with modern navigational aids, including radar, gyro-compass, fathometers and ship-to-shore telephone. Steering controls are hydraulic and all operations, except engine starting, are controlled from the pilothouse. Quarters are air-conditioned. 440 volt, three-phase, 60 cycle alternating current is supplied by two GM Diesel generator sets of 75 kw capacity.

Fuel tanks are located forward and aft and to either side of the machinery space. Both hull and superstructure of the vessels are of welded steel construction throughout. The superstructure includes the main deckhouse, upper deckhouse and pilothouse. The pilothouse, located atop the forward end of the upper deckhouse, houses controls for complete towboat operation with the exception of those for engine starting.

The boats have two steering gear systems, one for flanking and one for steering ahead. Steering en-

Mrs. Irene Chotin, with granddaughters Joey Scott Chotin, 12, and Patricia Irene Chotin, 16 before the twin diesel towboats were christened at New Orleans. Patricia christened the *Irene Chotin*, Joey had the same honor for her namesake, the *Joey Chotin*.



The second of two GM 16-567C diesel engines is lowered into the Joey Chotin as the towboat was under construction at the Dravo Corp. Neville Island shipyards.

Captain Scott Chotin at the controls of the *Irene Chotin*.

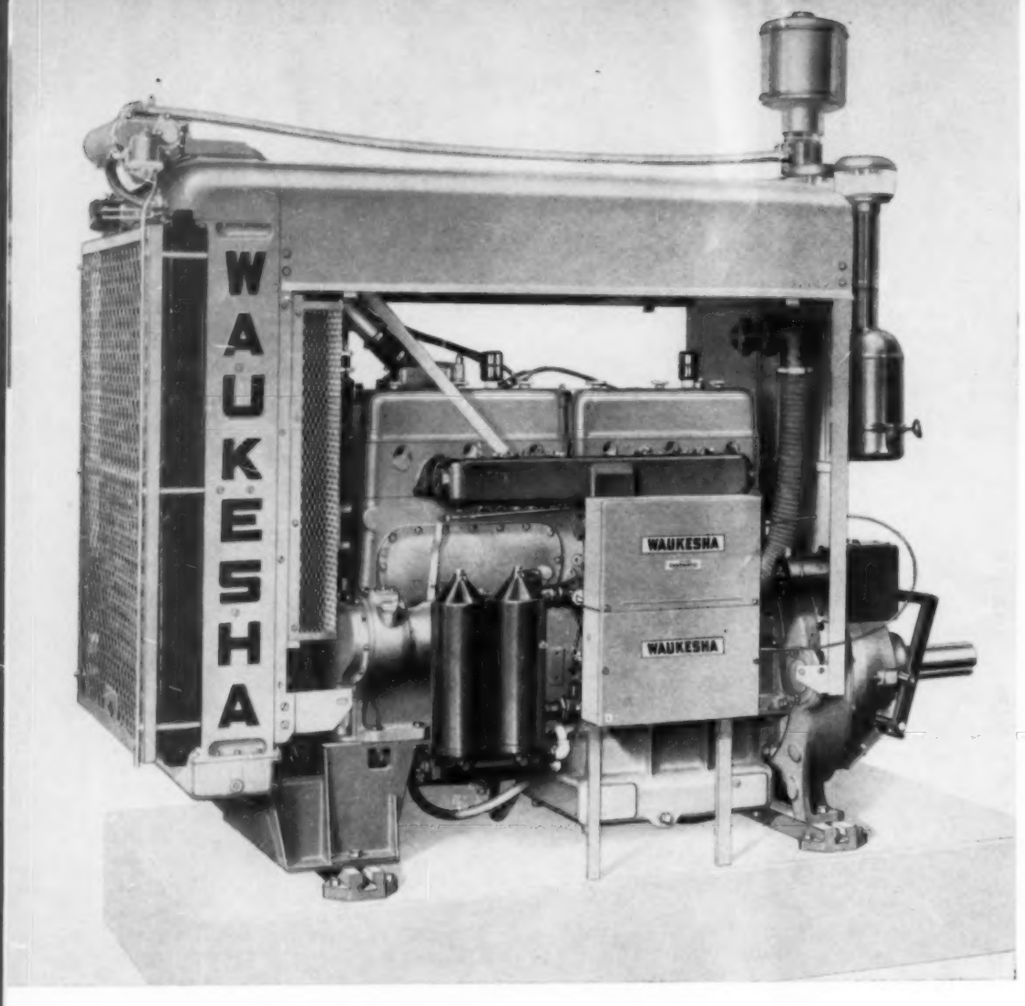
gines are located above deck level for easier access. Each system consists of a double-ended hydraulic ram, steering control valves and control and followup mechanism. Both rams are connected to a common hydraulic accumulator and pump. A second pump cuts in automatically when pressure falls to approximately 75 psi below operating level. Steering is controlled from the pilothouse console by means of push rods running to the steering compartment. Through the followup system, the rudders remain at the same angle as the levers in the pilothouse. Six balanced rudders control the vessels' course. One is located aft of each propeller for steering ahead and two forward of each propeller for flanking. The four-bladed propellers are 8 ft. 6 in. in diameter. Their pitch, area and blade form have been designed for use with the Kort nozzle. Just forward of each propeller is a single-armed steel strut which supports the propeller shaft. Both Avondale propellers rotate inboard at the top.

Each compartment of the boats can be emptied by the fire and bilge pump through a bilge manifold located in the foward engine room. An auxiliary bilge suction system in the engine room operates from the cooling system raw water pump on one engine. The engine-driven jacket water pumps circulate clean water through the engine, lubricating oil coolers and hull skin cooler. Separate skin coolers are fitted for the auxiliary engines.

Principal Equipment Serving GM Cleveland Engines Aboard *Irene Chotin, Joey Chotin*

Reverse reduction gears	Falk
Air compressors	Gardner-Denver
Air cleaners	Air Maze
Lube oil filters	Briggs
Lube oil strainers	Cuno
Lube oil coolers	Ross
Diesel generator units	GM Diesel
Auxiliary generators	Delco
Steering gear	Dravo
Propellers	Avondale
Switchboard	Lake Shore
Electric motors	Westinghouse

Two GM Cleveland 16-567C diesel engines propel the Chotin boats. The engines are rated at 1600 cont. hp at a propeller speed of 212 rpm. Note Air Maze filters.



Typical Waukesha Engomatic Control System mounted on a long life Oil Field unit. Control panel can be mounted in any convenient position.

ENGOMATIC POWER CONTROL

Precise Control of Engine Operating Periods and Load Engagement is Provided by This New Waukesha Motor Co., System

A NEW system that precisely controls engine operating periods and load engagement and dis-engagement is now being produced by Waukesha Motor Co. Called Engomatic, the system provides automatic engine operation by remote control, time cycle, radio impulse, liquid level, temperature differential or any other signal peculiar to the equipment involved. The time cycle control is a 24-hour device supplied by Waukesha Motor Co. and operates from the battery. All other remote control devices such as radio, liquid level switches, etc., must be supplied by the customer. On some models clutch engaging and dis-engaging is done automatically to permit automating many Waukesha engine driven loads.

Designed initially for oilfield controlled pumping or pressuring operations with Waukesha engines, the Engomatic has application in air conditioning, irrigation and similar fields where unattended controlled and intermittent engine operation is required. Currently the system is available as a package unit with Waukesha engines up to the model WAK and as a separate field installation unit for the larger engines. Waukesha Motors developed the power control system to increase flexibility of their oil field power units designed to run for long periods of time without attention.

A control panel mounted near the engine contains all the devices for automatic starting with intermittent cranking periods, controlled warmup, positive clutch control and variable operating time at governed speeds. The clutch control can also provide for initial counterweight swing reversal to start pumping in beam type applications. Operation is independent of outside power except for impulses received when the power control system is operated by remote control. The unit is fully protected with low oil pressure and high temperature shut-down devices, has visual indicators and operates equally well with engines using all standard fuels. Skilled personnel are not required for ordinary maintenance and service.

Produced in Six Models

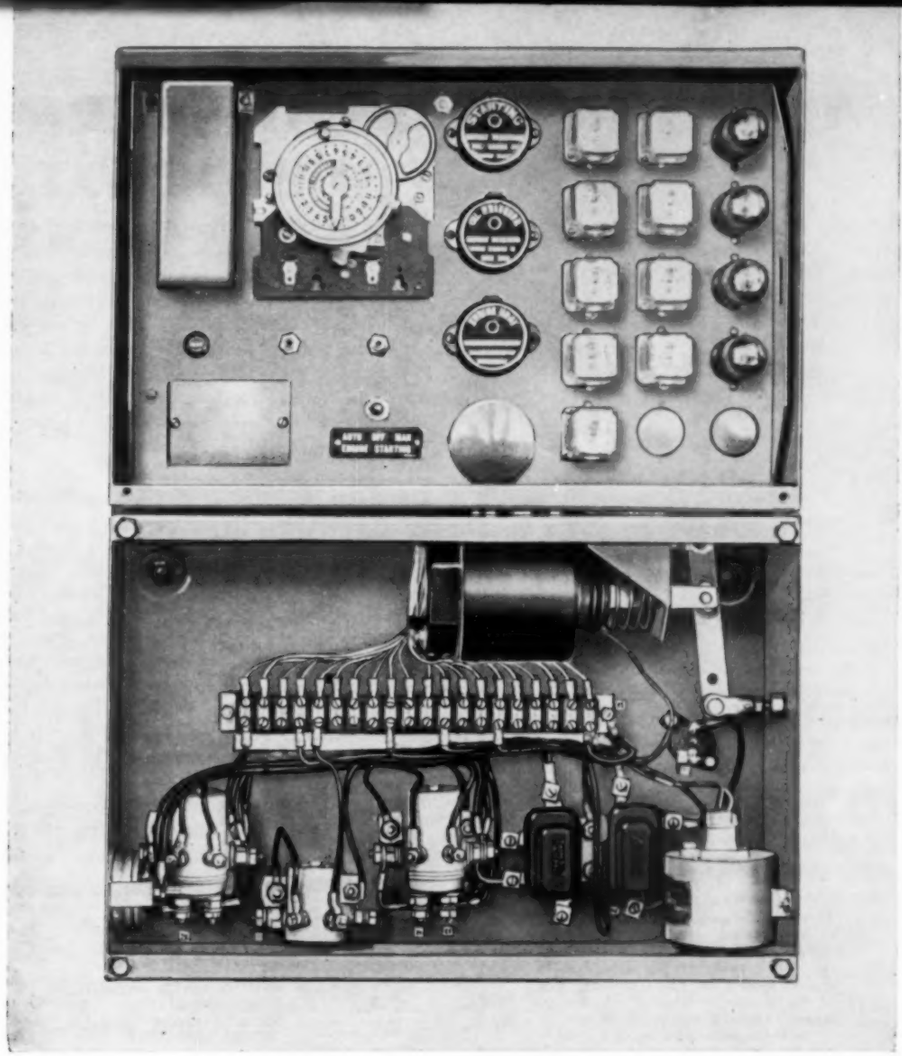
The Engomatic is produced in six models for varying applications. Models RN and TN provide controls for engines not requiring automatic clutch engagement. In all series the "R" models are actuated by remote switching while the "T" models are operated by a time switch. Models RS and TS provide single clutch engagement while the RR and TR units give repeated clutch engagement and disengagement for as many times as necessary to get the load underway for the oil well counterweighted pump installation. The clutch always disengages when the engine stops. Engine cranking and starting control is similar in all units.

When the control panel receives the signal from the remote or time switch, it removes the ground from the magneto, opens the fuel shutoff valve, energizes the automatic choke and begins to crank the engine. If the engine fails to start within a pre-set time (adjustable from 10-25 seconds) it rests for about 30 seconds, then the cranking cycle is repeated. The crank-rest cycle is repeated until the engine starts or the overall cranking time runs out. In case of a false start the unit provides a short rest period before another attempt is made to crank. A vacuum switch locks out the cranking circuit in the event of a false start so the starter will not be engaged with the rotating ring gear. Failure to start within a 150 to 180 second time provided will cause the overcrank switch to trip, dis-connecting the battery from all control circuits.

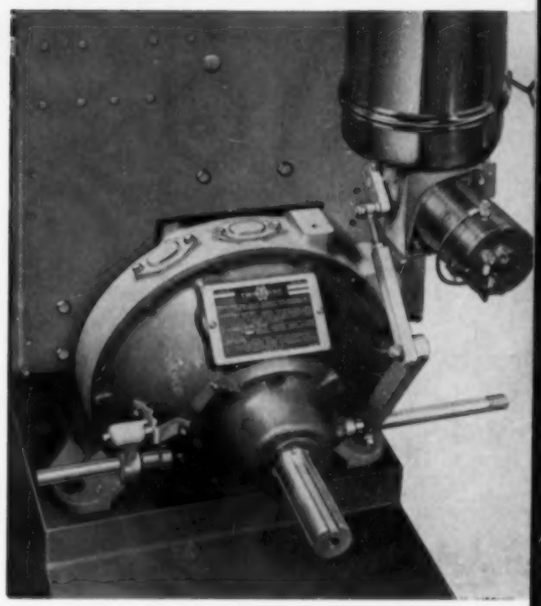
When the engine starts, the starting motor stops cranking and the low oil pressure and high engine temperature protective circuits are energized. If either of these switches closes and remains closed for 30 seconds while the engine is running, the trip switch will cause the engine to stop. All models provide a three minute warm-up period. The automatic choke may be connected to stop choking at the termination of cranking or at the end of the warm-up period. On models with the clutch engaging feature, the clutch engages at the end of the warm-up period. Normally, the engine will run until the initial actuating signal is removed by the remote or time switch. When the signal is removed the magneto is grounded, the fuel shutoff valve closed and the engine heat protective circuits disconnected. A period for cooling off the engine is also provided. If the customer chooses not to use it he may do so by making the proper connection at a control panel terminal strip.

Clutch Engagement

In the Engomatic models RR and TR, designed for use on a counterweighted oil well pump only, the clutch engages immediately after the engine warmup period. Should the load imposed by lift-



Open view of Engomatic Control panel showing wiring and electrical components designed for long life and easy accessibility.



View of automatic engagement-disengagement and Twin Disc power takeoff operated by the Engomatic control system.

ing the well pump counterweights be too great, a speed switch on the engine disengages the clutch. The power takeoff shaft then reverses direction as the weights fall. As soon as the weights start their forward swing and the take-off shaft again starts in the forward direction, a direction sensing switch on the shaft causes the clutch to engage again. This process is repeated until the engine is capable of driving the counterweights over top center in the forward direction.

If the counterweights are at the top instead of the bottom of the arc at initial engagement and do not swing back after the clutch is disengaged, the clutch again becomes engaged through a time circuit in the panel. Through continued clutch engagement and disengagement, the engine is able to drive the weight over top center and get the pump in operation. The clutch then remains engaged until the engine is stopped.

Presently, the controls available are 12 or 24 volt dc. Therefore, the engines must be equipped with a proper sized battery and charging equipment. If a trickler charger operating from some other power source is not available a battery charging generator must be installed on the engine. Each Engomatic power control model has a manual control and will operate continuously while the switch is at the manual setting.

For application of the Engomatic power control to existing Waukesha engines, the control panel with waterproof enclosure, the automatic choke, oil pressure switch, high temperature switch, clutch engager and all necessary wiring, are supplied in kit form. Also available are battery charging generator, voltage regulator and starting motors. The engine owner must supply the proper size battery and battery cables.

A typical Enginator Unit employing Engomatic Control System.

POWER SHIFT TRACTOR TRANSMISSION

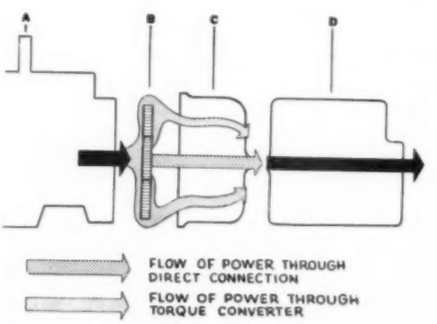
POWER shift transmissions, each of which features a new concept in the transmittal of tractor power, are now available on Caterpillar D8 and D9 Tractors. The new transmissions, built for rugged tractor service, provide instantaneous, one-lever control of gear shifting without interruption of power and momentum. Heart of the new power-tailoring arrangement is a planetary gear set, driven integrally by the engine flywheel, which transmits 1/3 of the engine torque directly to the transmission input shaft, and the remaining engine torque through the Twin Disc torque converter. Horsepower of both machines has been increased to give an additional boost to productivity. Horsepower of the Cat D8 power shift Tractor is 235; rating of the D9 model is 335.

On the operator's deck, one range selection lever now takes the place of the flywheel clutch lever, gear selection lever and forward-reverse lever. According to Caterpillar, this means reduced shifting time and more effortless shifting. The machines can be shifted on the move under full load; then instantly reversed to a high return speed to begin another work cycle. By directing a portion of engine torque straight to the transmission input shaft, great overall efficiency is provided, yet the solid feel of direct drive tractors is retained as is the impact force necessary in stumping and ripping operations. The remainder of the engine power is directed through the torque converter allowing the tractor to automatically adjust travel speed to load. Additionally, engine stalling under heavy lug conditions is reduced. The interaction of the mechanical and torque converter drives also reduces the tendency of the machine to lunge when suddenly releasing a load and provides audible indication that the engine is being lugged.

Prior to introducing the transmission, a fleet of 80 D8s and D9s was equipped with the new units and tested on contractors' jobs and at Caterpillar's proving grounds. These tests showed that, in bulldozing applications, the new power shift transmission allows the operator to instantly shift down under an increasing load; then, without loss of speed or power, shift up to optimum load-speed in drifting to the fill. In pushloading applications, the power shift allows the machine to approach the scraper at high speed, down-shift to intermediate range to provide fast loading speed for the initial stages of loading, drop to low range as the load builds, then shift up through intermediate and high range provide help for the scraper as it leaves the cut.

The D8 and D9 power shift tractors have a three-speed forward, three-speed reverse, planetary transmission. It consists of five in-line gear trains, each with a separate clutch. Two of the planetary trains are directional; three constitute the low, intermediate and high gear ranges. Control of the clutches is by a direct-acting hydraulic control system, designed and built by Caterpillar. Design of the hydraulic system is such that the speed range clutches are engaged first when shifting, followed by engagement of the forward or reverse clutches. This feature assures smooth transitions in speed when changing speed ranges. The transmission and torque converter are connected by a universal joint, providing unit construction which permits removal of either the transmission or the torque converter without disturbing other machine components. A safety lever is installed on the selector lever pedestal, which locks the selector lever in place when in the neutral position. The control system also contains a hydraulic safety valve, which automatically shifts the transmission into neutral when the engine is stopped.

Lubrication of the power shift transmission on both model machines is afforded by a separate vane-type pump located on the flywheel housing. It supplies oil through an individual filter to the transmission power clutch control unit, where it serves as hydraulic fluid for the transmission clutches. Lubricant is then channeled to the transmission bearings, gears, and clutch plates.



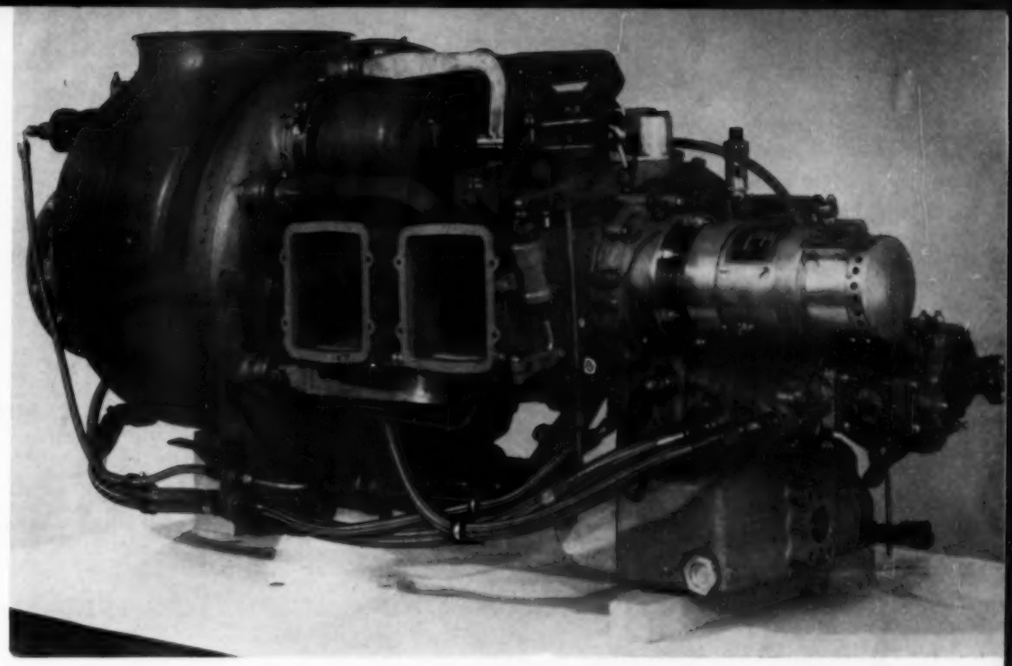
Torque is delivered by the engine (A) to a planetary gear set (B), where approximately 1/3 of it is directed to the input shaft of the power shift transmission (D). The remaining 2/3's of the torque is directed into the 3-stage Twin-Disc converter (C), then to the transmission input shaft.

Under the varying load demands of bulldozing, the operator of this Caterpillar D9 power shift Tractor shifts gear ranges and reverses direction simply by moving the lever under his left hand.

Gear range selector lever guide on new Caterpillar power shift transmission machines is horse-shoe shaped. One leg contains low (1), intermediate (2) and high gear (3) forward; other leg contains reverse in same ranges. Neutral is at the curve. Rear lever is manual safety, locks selector lever in neutral.

SMALL "GAS TURBINE OF FUTURE" IS TESTED

380 lb. Boeing Marine Unit Taken Up To 390 HP in 50 Hr. Performance



Boeing's 520 gas turbine is a simple cycle split-shaft engine. A 300 hp version of the turbine—the 520-1—is being developed under a U.S. Navy Bureau of Ships contract for propulsion purposes.

BOEING Airplane Co., Seattle, Wash., has successfully completed the first full-scale test of its new small marine "gas turbine of the future". Running at full power continuously for more than two days, the lightweight turbine turned in a performance above specifications in a 50 hr. proof test. Boeing engineers reported that the 380 lb. turbine was tested up to 390 hp—slightly more than one lb. of power per lb. of engine weight.

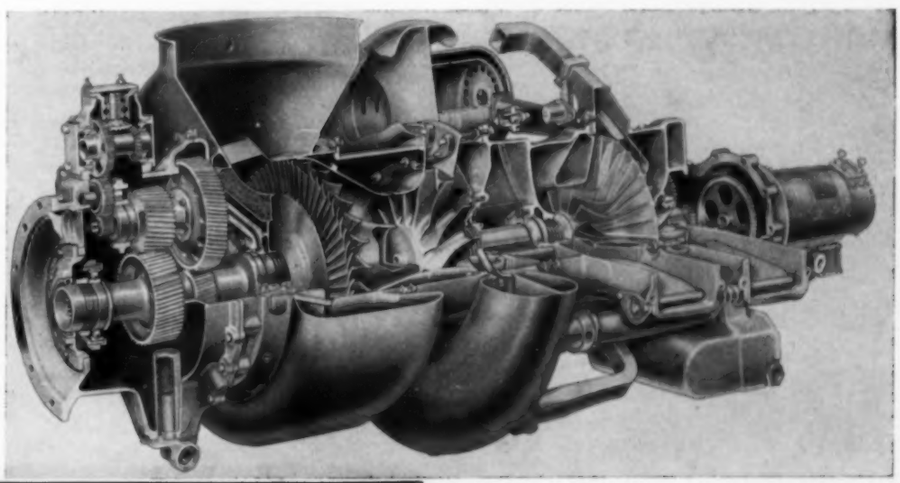
Fuel consumption was substantially improved over earlier powerplants, Boeing said. The advanced turbine did not use more than 8/10 lb. of fuel per hp hr. The new turbine—designated 520-1—was developed for the United States Navy Bureau of Ships in projected applications such as power plants for minesweepers and utility boats. Boeing engineers foresee a future for the turbine in commercial applications as a prime mover on both the land and the sea.

The first 50 hr. test for the 430 hp, 325 lb. aircraft version of the 520 series of Boeing turbines was scheduled for the fall of 1959. A wide range of applications, such as military and commercial aircraft, helicopter and flying platform power plants, is projected for this engine.

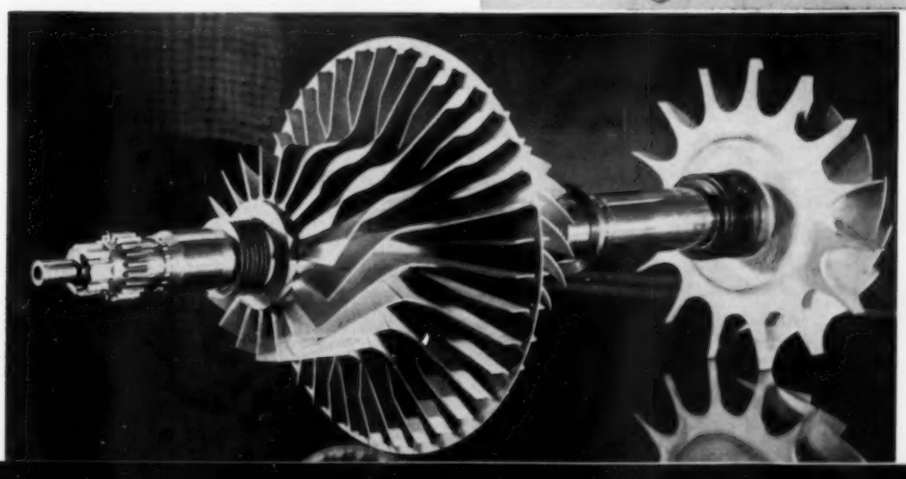
The 520 series of gas turbines utilizes a single-stage, double-entry radial compressor, radial compressor-drive turbine and a power turbine. Boeing's compressor in the new turbine yields a pressure of 6.5 atmospheres. Boeing says that this is the highest known performance for any single-stage compressor. Bureau of Ships specifications for the 520-1 call for 300 hp at a specific fuel consumption of .8 on an 80° F. day.

Mr. W. B. Anderson, engineering manager of the 520 series, said that simplicity was an important consideration in designing the engine. The use of single-stage elements throughout the engine will cut production and maintenance costs. Anderson said that at the end of the 50 hr. continuous full power operation, virtually all parts of the new turbine were in near perfect condition. Boeing engineers have set a goal of 2000 hrs. between overhauls for the new turbine.

The 520-1 is being prepared for further testing in an intensive program to make the new turbine available for Navy applications. The advanced engine first ran in the summer of 1958 and since has been undergoing developmental testing leading up to the initial 50 hr. proof test. Boeing has conducted a small gas turbine research, development and production program for 16 years.



Cutaway view of the 520 gas turbine shows engine's internal construction. At right is double entry single-stage radial compressor, which compresses air to 6.5 times its original pressure. One of two combustion chambers can be seen above the compressor. The single-stage radial turbine which drives the compressor is in the center. To the left is the single-stage axial-flow power turbine coupled to reduction gear producing the usable horsepower. Engine gases are exhausted directly above the power turbine.



This is the gas producer main rotor in the 520 gas turbine. The engine's single-stage inducer-impeller is in the foreground and the single-stage compressor-drive turbine is at the right.

WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **BERNARD W. LANSDOWNE**

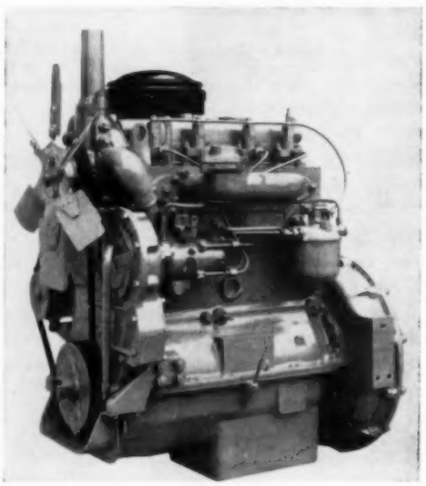
Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

New Additions to the Perkins Range

THREE new diesel engine designs embracing agricultural, industrial and marine applications are in process of being introduced by F. Perkins Ltd., of Peterborough. This follows closely upon an announcement by the same company that they had concluded an agreement with the Solar Aircraft Co. whereby Perkins have exclusive rights to manufacture and sell throughout a large part of the world all the gas turbines developed by the American company.

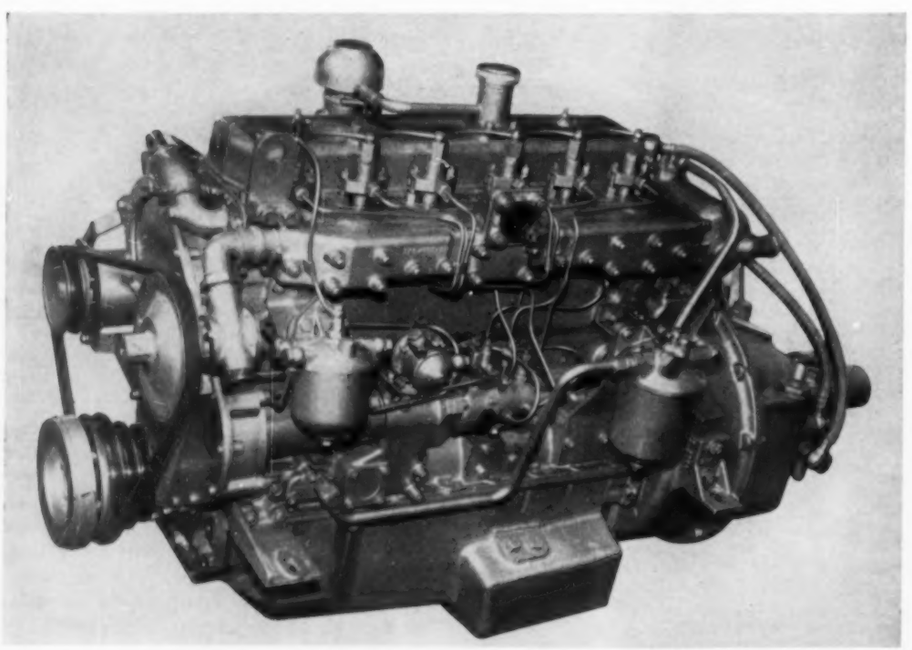
These facts provide impressive evidence that, notwithstanding their recent take-over by the Massey-Ferguson organization, for which they are now the main diesel engine supplier, the Perkins Company intends to pursue its longstanding policy of providing small diesel engines to meet every conceivable need and application.

The Perkins net indeed now spreads even wider with a further announcement in mid-November of the company's large scale entry into the outboard engine market with a range of engines previously built by the Oliver Corp. and now to be produced in a new factory near the main Perkins Works at Peterborough. These outboard engines, however, in the foreseeable future will only be available as petrol units, but work is already in hand to produce a comparable range of outboard engines for operation on diesel fuel.



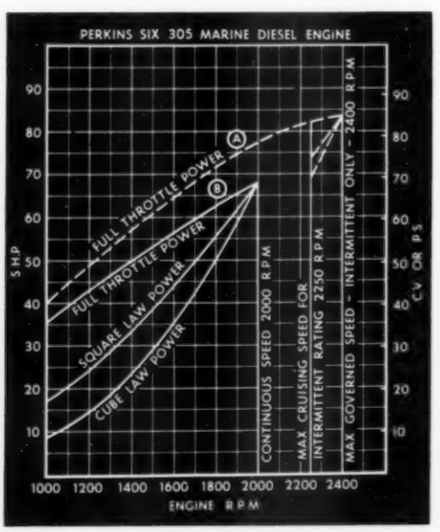
Perkins 6 cylinder Six 288 (TA) agricultural diesel engine.

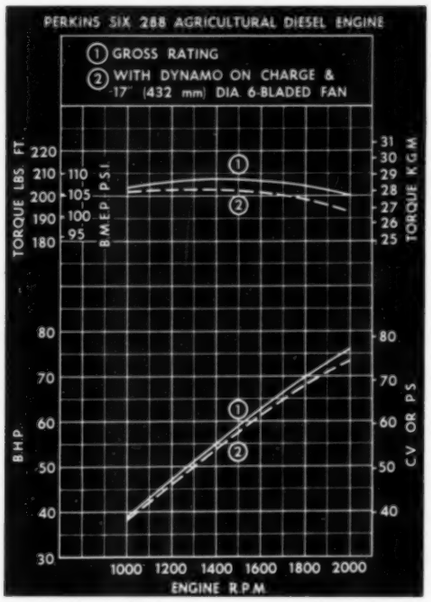
Perkins 6 cylinder Six 305 (M) marine diesel engine.



Largest of the three new engines announced by Perkins is a marine diesel introduced at the National Boat Show in London during the first days of January in 1960. It is known as the Six 305 (M), a 6 cylinder unit developing 84 shp at 2,400 rpm, for intermittent service with a continuous rating of 68 shp at 2,000 rpm. It is particularly suitable for various types of pleasure craft and is available with direct sea water cooling, fresh water keel cooling, or fresh water heat exchanger cooling. It has bore and stroke dimensions of 3.6 in. and 5 in. giving a swept volume of 5 li. Among its important design features are the chromium plated thin wall cylinder liners and a crankshaft with its rear main journal burnished rolled at the fillet radii to give increased fatigue strength. The fuel injection system uses a distributor type fuel injection pump.

Power curve for Perkins 305 marine engine.


PERKINS SIX 305 MARINE DIESEL ENGINE
S.H.P.
C.V. OR P.S.
FULL THROTTLE POWER
FULL THROTTLE POWER
SQUARE LAW POWER
CUBE LAW POWER
CONTINUOUS SPEED 2000 R.P.M.
MAX. CRUISING SPEED FOR INTERMITTENT RATING 2250 R.P.M.
MAX. GOVERNED SPEED – INTERMITTENT ONLY – 2400 R.P.M.
10 20 30 40 50 60 70 80 90
1000 1200 1400 1600 1800 2000 2200 2400
ENGINE R.P.M.



Power curve, Perkins Six 288 agricultural engine.

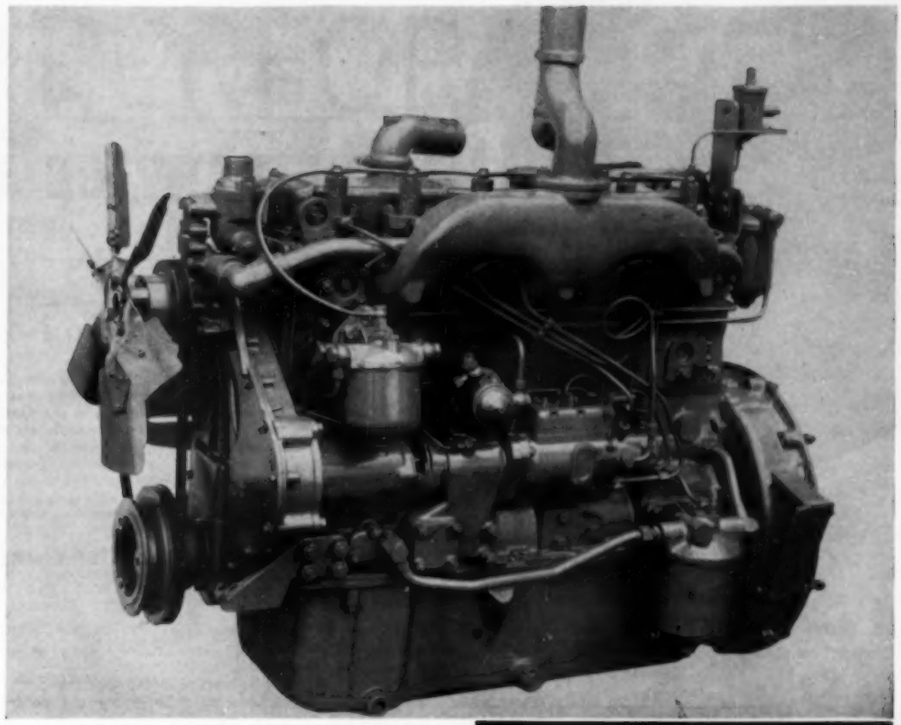
The new industrial diesel has the same cylinder dimensions as the new marine unit, namely 3.6 in. by 5 in., but has only 4 cylinders giving a swept volume of 3.33 li. This engine will be known as the Four 203 and Perkins intend offering also a virtually identical version known as the Four 192 having a slightly smaller bore of 3.5 in. The larger unit gives 47 bhp at 2,000 rpm and the alternative smaller design gives 45 bhp at 2,000 rpm. An important and attractive feature of these new industrial units is the practical method provided for meeting power take-off requirements. A gear drive is used for the timing and this allows power take-off from the gearing at two points.

Facilities are available for driving from the camshaft gear a hydraulic pump with a capacity of up to 17 gal. per min. at 1,700 lb. per sq. in. to operate main hydraulics such as fork lift truck equipment. Provision is made also for a hydraulic pump beneath the fuel pump where it is particularly suitable for connecting up to power assisted steering systems and controls.

The new Perkins Six 288 agricultural engine, the third of the new units just announced, is designed for large heavy self propelled combine harvesters, medium or heavy wheeled or crawler tractors and similar duties. It is a 6 cylinder design with 3.5 in. bore by 5 in. stroke and provides 76 bhp at 2,000 rpm. A mechanical governor on the engine gives very accurate speed control and makes the engine admirably suitable for combines where constant drum speed is essential and also for any belt drive operations from the power take-off of tractors.

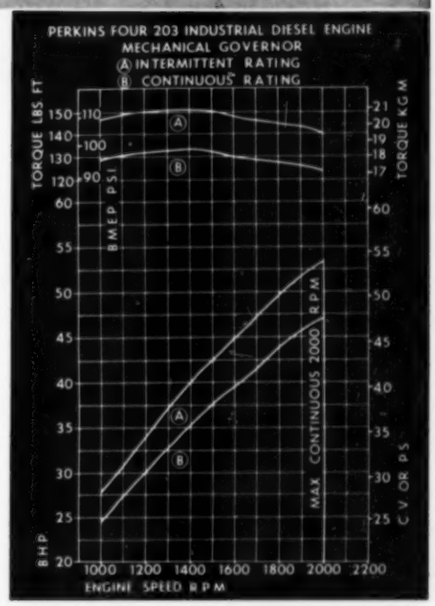
Rootes Multi-Fuel Engine

THE Rootes opposed-piston 3-cylinder two-stroke diesel engine with blower assisted scavenge, which has proved so successful all over the world in Commer trucks and other applications is to be made available as a multi-fuel engine. Announcing this recently, the Rootes group state the



Perkins Four 203 (I) industrial diesel engine.

Power curve, Perkins Four 203 industrial engine.



engine will operate in its new form on diesel oil, regular and military gasoline, kerosene base fuels and jet fuels known as JP 3, 4 and 5.

Although primarily for military applications in installations not necessarily produced by the Rootes group, the engine in multi-fuel form will be of considerable interest to civilian operators in territories where certain fuels are scarce or intermittent in supply. Very few modifications are necessary to enable the standard engine to operate on these fuels. The main changes concern the fuel injection equipment and include provision for boosting the fuel delivery pressure to the injection pump, thereby overcoming the possibility of vapor lock with volatile fuels. This is achieved by increasing the feed pump delivery pressure and by fitting an electrically driven pump in the tank which supplies fuel under pressure to the feed pump.

Also, to lubricate the pump camshaft and tappets, a supply of lubricating oil is fed through a metering device into the pump cambox. This is then drained back into the engine sump. A further supply is also pumped under pressure to an annular groove around the pump plungers thus acting as a hydraulic seal.

When the engine is operated on fuels other than diesel oil, its thermal efficiency remains almost unchanged. This results from the two-stroke design characteristics, including the exceptionally small combustion chamber area which is exposed to any cooling effects, the hemispherical pistons crowns (which form the combustion chambers) being made from heat resisting material and insulated by limited contact from the piston bodies.

Owing to the engine port design moreover, intimate mixing of the air and fuel by swirl, together with the heating effect of the Rootes type blower, helps considerably in maintaining the engine's high thermal efficiency. Although it is inevitable that there is a drop in power when running on petrol as against oil, due to the lower specific gravity of the former, this can be overcome by adjusting the injection pump, and a rapid adjustment giving two settings (one for diesel, the other for petrol) is provided.

As high octane fuels tend to increase the delay period (the time taken from commencement of injection to combustion of the air/fuel mixture) the engine runs more smoothly on low grade petrols, thus reducing operating costs.

DIESEL SERVICE PROGRESS

A COMMENTARY BY **GEORGE R. MACKEY**

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

Diesel Engine Service and the Customer

IT is almost impossible to foresee all of the factors service outlets should consider while formulating plans for establishing a complete service program, or to assure that conditions will permit the adoption of specific plans. Each service operation will, of necessity, be required to develop plans and organize programs based largely on local conditions. Nevertheless, there are certain basic broad-range considerations which will apply to most field service situations. First and most important is to determine to what extent complete service facilities must be developed for both field and resident service. This can only be done through careful survey and analysis. Narrowing this down to specific operating requirements for engines in a specific area, or those used in seasonal type operations, considerations must be given to engines to be serviced and customers to be satisfied.

A prospective engine owner is an interested party in search of power and performance. Naturally, he will be influenced in purchasing the unit which, in his mind, will be the most economical. Since this is the case, it is necessary to consider from a customer's viewpoint those items which will be used to evaluate overall economy. While the advertised fuel consumption rates of different types of engines are of prime importance, there are many other factors which often receive equal consideration, especially by the experienced engine purchaser. These important considerations are: (1) initial investment, (2) economical maintenance, (3) dependability, and (4) availability of complete service. The initial investment required to purchase one make of diesel in preference to another of comparable size and power is relatively close in today's competitive market, and while sometimes is a determining factor, it oftentimes is overlooked as not being paramount to others. Economical maintenance means relatively low operating expenditures on items such as operating labor, preventative maintenance, minor, and major overhaul costs. Dependability does not necessarily mean extreme durability or long engine life, but rather durability to the extent of having power when it is needed. If engine performance is considered in any other light, it is conceivable that it could be under repair a good portion of the time and still be considered dependable. In many instances, when a malfunction or engine failure has been detrimental to the required power of an application, the actual operating costs and lower productivity involve a great loss. This loss would be in excess of normal expenditures annually required for preventative maintenance and routine inspections. It can, therefore, be considered without qualification that complete efficient service is a definite necessity for the successful performance and the continued sale of diesel engines.

Customers' Attitude Towards Service

Reports from engine owners and operators in all fields show the need for continuous analysis and careful planning. One of the most common customer complaints is that the service job is not done right the first time or that the job is only partly completed. This dissatisfaction involves repairs in the service shop as well as those performed in the field. Even though qualified service operations absorb the cost of second or third efforts on a warranty or policy basis, the actual cost to the customer in the way of equipment downtime is sometimes staggering and does not contribute to good owner–dealer relations. Time required to finalize service repair orders, or the service outlet's failure to live up to promises for job completion are other causes for customer dissatisfaction. Another phase of the service operation contributing to customer concern is the variation in final service charges compared to earlier estimates. This discontent will lower the owner's confidence in the outlet's ability to fulfill its responsibilities, and will lead to a poor service reputation.

A good method of evaluating the position of a service operation is to observe it through the customer's eyes to see if it appears favorable. Observe the organization's personnel the same way to determine the type of treatment which may be expected after purchasing the commodity.

The ability to perform accurate diagnosis is still another service operation responsibility. Failure to meet this obligation further detracts from the outlet's reputation and could possibly make the customer dissatisfied with his engine investment. When we consider the owner's original investment for power, we can expect him to make the necessary service purchases to safeguard the power if engine performance should be below par. Therefore, owners expect a proper diagnosis which pinpoints operating difficulties quickly and accurately. They are reluctant to pay for hit or miss methods in determining performance problems. Proper diagnosis following systematic procedures gives the customer confidence and assures him fair charges.

Proper use of instruments as an aid in fast, accurate diagnosis not only permits a technician to perform efficiently but adds to the customer's confidence and assurance in receiving fair, competent service. The instruments used should conform to the engine manufacturer's recommendations, and should be called to the owner's attention. A large number of service outlets use a field diagnosis kit to measure engine performance, or the function of engine systems. Quite often, measurements made during diagnosis in the field are compared to similar measurements obtained during rated horsepower Dynamometer test. Many of these field kits are replicas of accessory instruments used in the Dynamometer test-room. They consist of (1) an accurate master pressure gauge for measuring engine oil and fuel pressures, (2) a suitable gauge, or water manometer for measuring air inlet restriction, crankcase pressure, or blow-by, (3) a suitable gauge or mercury manometer for measuring exhaust back pressure, air box, blower or turbo-charger pressure, (4) thermometer for checking oil temperatures, (5) gauges for measuring tolerances, and (6) devices for computing fuel consumption. Use of this type of equipment to compare actual operating conditions to factory specifications can be extremely valuable while performing diagnosis. It can also influence customers on the completeness of available service. With this equipment, a technician can pinpoint malfunctions and make corrective repairs the first time. Furthermore, a complete inspection on all of the engine systems brings to light other factors that could conceivably lead to future operating problems. Proper recommendations and repairs at this time will avoid additional field service costs and down-time.

Chandler is Promoted

John W. Chandler, a World War II navy veteran and a graduate of the University of Minnesota, has been appointed manager of the St. Paul Branch of Fairbanks, Morse & Co., it was announced today by V. H. Peterson, Fairbanks-Morse vice president for sales. The promotion gives Chandler responsibility over a wide area for the selling of all types of Fairbanks-Morse products. The area covers Minnesota, North Dakota, western Wisconsin, Montana east of the Rocky Mountains, and all of South Dakota except the southernmost and westernmost counties. Mr. Chandler before his promotion was manager of the diesel department in the St. Paul Branch. He, is a registered engineer in Minnesota and North Dakota, and was graduated from the Institute of Technology of the University of Minnesota in 1943, with the degree of Bachelor of Mechanical Engineering. From 1943 to 1946 he served as an engineering officer on various American naval vessels in the Pacific area during and immediately after World War II. After completing his naval service, Chandler was employed by the St. Paul Branch of Fairbanks-Morse as an assistant in the diesel engine department. In 1952 he was promoted to field engineer specializing in diesel sales. In 1954 he was promoted to diesel department manager. As manager of the St. Paul Branch, Chandler succeeds H. E. Hanson, who has been promoted to the position of general manager of the diesel, compressor, and locomotive group in the Beloit (Wisconsin) Division of Fairbanks-Morse.

Cooper-Bessemer Forms New Sales District

F. M. Devin

Formation of a new sales district by the consolidation of the western Pennsylvania and Ohio areas has been announced by The Cooper-Bessemer Corp., Mount Vernon, Ohio. Headed by Mr. F. M. Devin, vice president and district manager, the new sales territory will be known as the East Central District and will be composed of three individual territories. Working under Devin's direction in the district are Mr. R. L. Reynolds, Grove City (Pa.), branch manager; Mr. J. R. Craine, Mount Vernon (Ohio), branch manager; and Mr. J. M. Brannaman, Pittsburgh branch manager. Reynolds will have charge of all marine sales throughout the new district. Craine and Brannaman will be responsible in their respective territories for the sale and application of compressors for gas transmission and processing, engines for all general industrial purposes and all other Cooper-Bessemer products.

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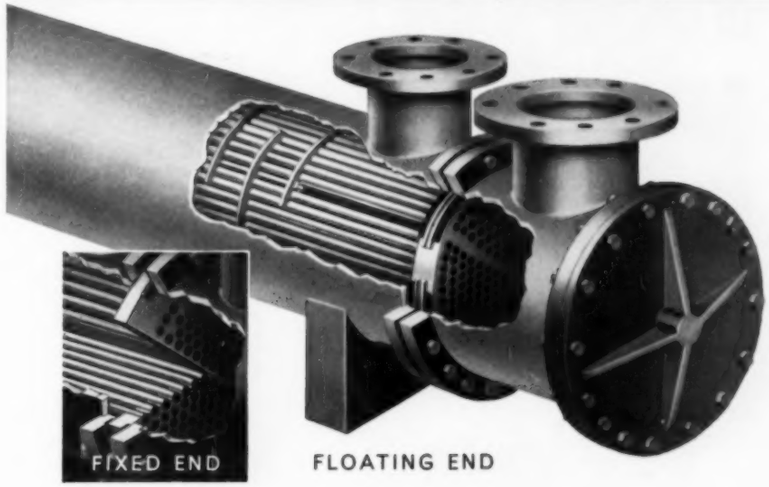

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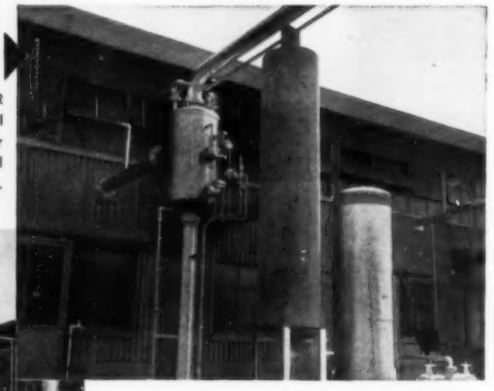

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Most Powerful International Crawler

The International TD-25 diesel tractor—most powerful crawler ever produced by International Harvester Company—now is coming off assembly lines at Melrose Park, Ill., it was announced by Harald

T. Reishus, Construction Equipment Division vice-president. The new TD-25 is available in either a torque converter or gear-drive version. Both are powered by International's DT-817 turbocharged engine—a six-cylinder, four-cycle, direct-starting engine developing 230 net hp at the flywheel at 1,500 rpm. Marking a major advance in equipment standardization, the International DT-817 engine is also used in other large International earthmovers such as the Payscraper, Paywagon and the Payhauler. Four speeds forward and reverse are offered by the torque converter TD-25, which has a drawbar pull up to 70,000 pounds at .75 mph, with adequate weight and traction. Operating weight is 46,000 pounds. The gear-drive TD-25, with an operating weight of 45,500 pounds, has a 46,700-pound drawbar pull in first gear at rated governed speed. It has eight speeds forward and reverse.

Dr. Alfred J. Buchi, Turbocharging Pioneer, Dies in Switzerland

A pioneer in diesel engine development, Dr. Alfred J. Buchi, died in Switzerland on October 28th. Dr. Buchi, who celebrated his 80th birthday on July 11, lived at Winterthur in Switzerland.

Generally credited with pioneering development work in turbocharging internal combustion engines, Dr. Buchi filed patents for employing hitherto unused exhaust gases to drive a charging blower as early as 1905. The Buchi syndicate, to develop exhaust turbocharging on a broader scale, was formed in 1926 with Dr. Buchi, the Swiss Locomotive and Machine Works at Winterthur and the Brown, Boveri & Co., at Baden as partners. Eventually engines with turbocharging features developed by the Buchi syndicate were being built and used throughout the world.

Dr. Buchi was awarded the Melville medal by the American Society of Mechanical Engineers in New York in 1937; the Swiss Federal Institute of Technology conferred an honorary doctor of engineering degree on him in 1938. Dr. Buchi was also a winner of the Henderson Medal of the Franklin Institute of Philadelphia.

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Union Pacific's new and mighty locomotive crests Sherman Hill, Wyoming, with a heavy load.

WORLD'S MOST POWERFUL LOCOMOTIVE SPEEDS FREIGHT ECONOMICALLY WITH BENDIX FUEL AND IGNITION SYSTEMS

This is the world's mightiest self-powered locomotive at work. On level track, it can pull 735 fully loaded freight cars—a train more than seven miles long! Its two engines—an auxiliary diesel engine and a gas-turbine power plant—depend on Bendix fuel injection and ignition systems to help keep its mighty power flowing smoothly and efficiently.

This new gas turbine-electric locomotive, built by General Electric for Union Pacific, is designed to haul freight faster and more economically. It burns less expensive "residual" fuel—a thick, viscous substance with a heavy tar content which must be heated before it will flow freely.

The Bendix ignition system fires this low-volatile fuel as efficiently as volatile gasoline is ignited in your automobile engine. The Bendix fuel injection system is used in the auxiliary diesel engine, which also furnishes power for "yard" movement of the locomotive.

General Electric has been an important builder of locomotives for more than 65 years. To be selected as the supplier of fuel injection and ignition equipment by G.E. for the mightiest locomotive they have ever built, is truly one of the finest tributes that could be paid to the all around efficiency of Bendix equipment.

It is equally impressive that whenever exceptional performance, complete dependability and operating economy are the requirements, diesel engine manufacturers in increasing numbers are turning to Bendix for their fuel injection and ignition requirements.

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Mobile Classroom Teaches Maintenance Service Points

A new mobile classroom to teach preventive maintenance and service techniques on Detroit Diesel engines, for distributor personnel and fleet operators, has recently been introduced in Los Angeles. Introduction of the truck-contained service school was held at the factory of the Clayton Manufacturing Co., El Monte, and was sponsored by the Anderson-O'Brien Co., Los Angeles distributor for the Detroit Diesel Engine Division of General Motors. During the two day course a complete orientation on preventive maintenance was taught, and instruction given in tune-up, trouble shooting, and proper service procedures. Instructor of the

class was William Saunders, service training representative from Detroit Diesel's product service school. Mr. George Mackey of the Dynamometer Division, Clayton Manufacturing Co., conducted sessions on engine testing and horsepower analysis with Clayton Chassis and Engine Dynamometers.

First British On-Highway Unit With Scottish-Built Cummins Is in Service

The first British on-highway vehicle powered by a Scottish-built Cummins diesel engine has gone into service. It carries general merchandise between Glasgow, London and Bristol. The truck, a Seddon eight-wheeler owned by the Scottish Co-operative Wholesale Society, averages about 1200 miles per week. Its Cummins model HF-6-B diesel engine was built at the Cummins Engine Co. Ltd. plant in Shotts, Lanarkshire, Scotland. The engine has 178 hp at 2100 rpm and has maximum torque of 494 lb./ft. at 1450 rpm.

The vehicle has an overall length of 29½ ft. with a body length of 24 ft. and a width of 8 ft. Gross laden vehicle weight is 24 tons—maximum permissible load for an 8-wheeler (four axles). During a

This Seddon eight-wheeler is the first British on-highway vehicle powered by a Scottish-built Cummins diesel engine (an HF-6-B). From left are: Mr. William Forrester, the driver; Mr. H. M. Dick, transport manager for the truckowner, Scottish Cooperative Wholesale Society; Mr. Paul Every, managing director of Cummins Engine Co. Ltd.; and Mr. John Hitchison, director for S.C.W.S.

recent test run when fully laden and averaging a speed of 25 mph over average terrain, a fuel consumption of 9.1 mpg was obtained. With a top gear ratio of 1:1, rear axle 5.6:1 and 9 in. by 20 in. tires, this truck is capable of a maximum speed of nearly 50 mph. The country's present laws do not permit speeds over 30 mph for vehicles of this size.

On the occasion of the first Scottish-built Cummins going into service in Britain, Mr. Paul Every, managing director of Cummins Engine Company, Ltd., said that it was essential to Britain's economy for a network of highways to be built to carry heavier, faster trucks and busses so that the advantages of the diesel could best be utilized. He said that the Shotts plant already was supplying a number of diesel engines to British truck manufacturers for vehicles destined to many overseas markets where larger weights and higher speeds are accepted.

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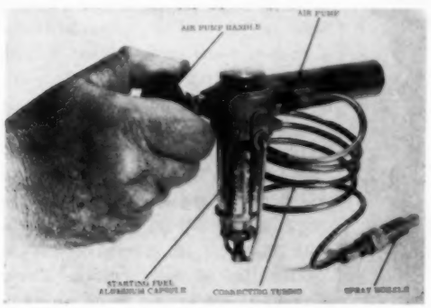
New Electro-Motive PR Director

R. D. Innes

Appointment of Robert D. Innes as director of public relations for Electro-Motive Division of General Motors is announced by Richard L. Terrell, vice president of General Motors and general manager of Electro-Motive. Mr. Innes, former assistant director of public relations, succeeds Volney B. Fowler who died October 6th. Born in Berwyn, Ill. Innes graduated from Medill School of Journalism, Northwestern University, in 1938. He started his newspaper career with the LaGrange, Ill., Citizen and subsequently served as news editor of the South Haven, Mich., Daily Tribune; staff correspondent for the United Press in Minneapolis, Minn.; and reporter and rewrite man for the Chicago Daily News. He took a military leave of absence from the Daily News during World War II to go on active duty with the U. S. Naval Reserve. He was released from active duty as a lieutenant (jg) in March, 1946. He was chemical and science editor of the Chicago Journal of Commerce prior to joining Electro-Motive in October, 1949, as assistant director of public relations. Since July 1, 1954, he also has handled the duties of advertising manager.

Start Pilot Quick-Primer

Start Pilot Corp. has developed a new, small, and inexpensive starting primer called Start Pilot Quick-Primer, model #962, which utilizes either a 7 cc or 16 cc aluminum capsule. The primer can be installed in the driver's cab and near the regular engine starting button and can be operated by



the engine operator from his normal operating position. The engine operator has complete control over the amount of fluid to be applied as, at the moment the engine fires consecutively, he can immediately discontinue the pumping operation. Each capsule contains enough fluid for between three to five starts. The capsules are nationally available through Start Pilot distributors, and also through all dealers and branches of Mack Trucks, Inc. and the White Motor Co. (ITS NEW)

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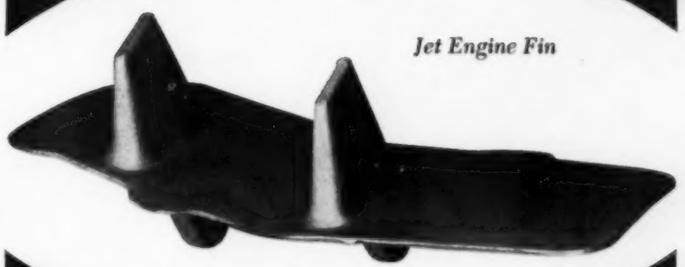
THE PART THAT "COULDN'T BE FORGED"



Jet Engine Fin

The jet engine fin shown above, is just one of many difficult configurations that Arcturus has forged after others said it couldn't be done. Originally these fins were machined from a forged rolled ring...a time-consuming, expensive procedure.

Using their highly-advanced techniques, Arcturus developed a method for forging the part, saving substantially on material and machining time...resulting in a cost reduction of 38%.

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Florida Diesel News

By Ed Dennis

FLORIDA Georgia Tractor Co. supplied one of the new TD25 crawler tractors powered by a 230 hp turbocharged International diesel engine and torque converter to Bransfield & White of Carol City.

AT Lake Wales, the Whitmore Construction Co. took delivery of a model 22B Bucyrus Erie dragline powered by a 3-71 General Motors diesel and the Orlando Paving Co. of Orlando received a 124 Trojan front end loader powered by a similar diesel.

FOR Haiti, two Kato ac 350 kw 600 volt 1200 rpm 60 cycle generating sets powered by two model D397 series D turbocharged Caterpillar diesel engines rated 650 max hp; shipped via West India Shipping Companys "Cat" powered *Inagua Cloud* freighter.

CUMMINS, model NVH-12N diesel engine, developing 290 hp at 1800 rpm, supplies propulsion for the newly launched *Lennoxville* of Beaufort, N. C. Other specifications included were a 3:1 Twin Disc r&r gears, 3 in. monel propeller shaft, Columbian 36x34 four blade propeller. The new vessel is a 72 ft. menhaden seiner built for fishing the Atlantic.

RECENT G. M. dieselized marine installations included a 6-71 in the new towboat *Helen Mary* of the Dohagon Dredging Co. of Port Tampa; a 6-110 in the shrimp trawler *Florence B* of Bon Secour and the Pan American Corp. of Lake Charles, La. repowered their 22 ft. utility craft from gasoline with a G. M. 4-53 diesel engine.

TWO Waukesha diesel engines model 135 DKBS provide power for the South West Water Plant on New Providence Island in the Bahamas. These six cyl. turbocharged diesel engines have a bore and stroke of 4¼ x 5 in. and a displacement of 426 cu. in.

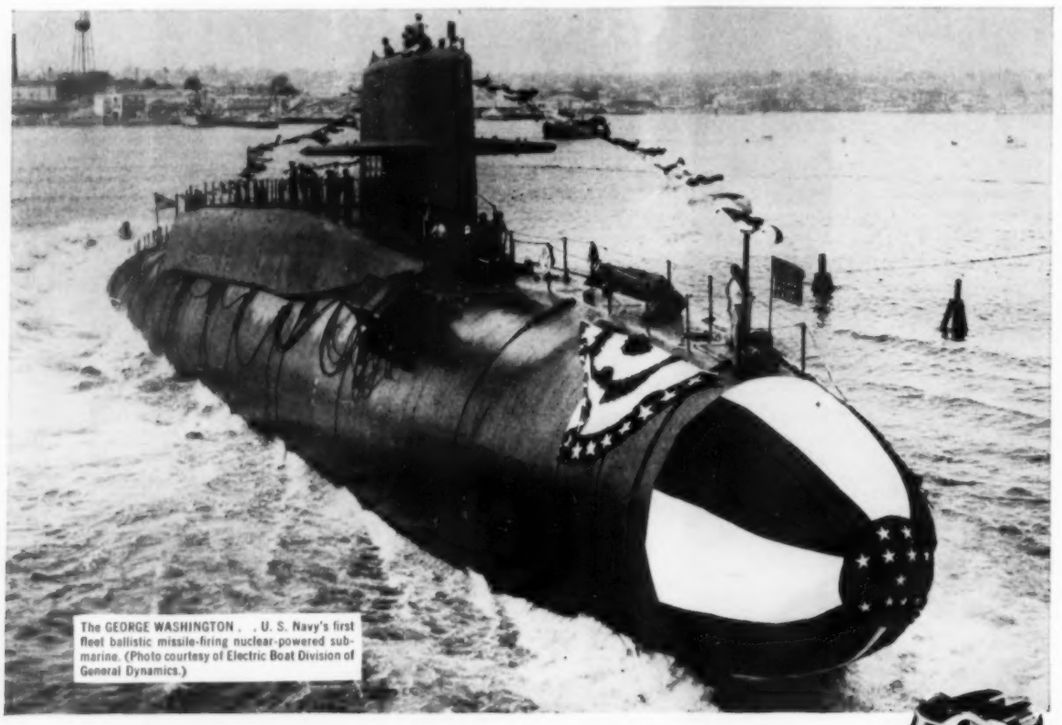
UP at Bellview, Gill & Mc Donald subcontractors on four laning almost 10 miles of U. S. 411 and 27 were using three Caterpillar DW21 tractors and #470 scrapers (300 hp turbocharged Cat diesel) assisted by two Cat D8 dozers and two Cat #12 patrols to handle the estimated 279,493 cu. yds. of borrow fill needed for the new road bed.

HIALEAH Branch of the Cummins Diesel Sales Corp. engineered the two new 36 in. 25,000 gpm B-C irrigation and drainage low lift pumps on the Smith, Green & Edsalls 920 acre grove at West Fort Pierce. These pumping units are powered by two model HRC-4 Cummins diesel engines rated 85 cont. hp at 1800 rpm and have Twin Disc power take-off.

FOR the new pumping station on highway #27 near Andytown, two Delco 100 kw G. M. dieselized (6-2057) generating sets and one 30 kw Delco generating unit (G. M. 3064B). This station is part of the Central and Southern Florida Flood Control Project being supervised by the Corps. of Engineers at Jacksonville.

J. FRANK Knorr Co. of Miami supplied two model MD67-A Penta marine diesel engines (Volvo) for the party fishing craft *New Helen S.* This 65 ft. vessel fishes out of Pompano Beach and is a sister ship to the *Helen S* also repowered with Penta diesels. Specifications included 2.5:1 Capitol 2-HE10, 700 hydraulic r&r gears, fresh water cooling and 24 volt Robert Bosch generators and starters. Keith Kelley did the engineering for both of these fine jobs.

DUVAL County Highway Dept. received a TD20 crawler tractor with hydraulic bullgrader and a similar model went to



The GEORGE WASHINGTON . . U. S. Navy's first fleet ballistic missile-firing nuclear-powered submarine. (Photo courtesy of Electric Boat Division of General Dynamics.)

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Fulflo Filters, with patented Honeycomb Filter Tubes, minimize troublesome gumming — remove moisture, oil, microscopic rust, dust, dirt and scale from your air lines. Single-tube models are designed for pressures from 125 to 4,000 psi. Multi-tube models are available for large flow rates or central installations.

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Volusia County. Both are currently being used on road construction work and are powered by International 134 net hp diesels and International Harvester six speed full reverse transmissions; from Florida Georgia Tractor Co.

THE *Eda*, a 167 ft. yacht formerly of Venezuela and now in Miami, has, for main propulsion, two model DMG 8 cyl. Enterprise diesel engines. These 12x15 in. diesels develop 1000 hp each at 475 rpm. Two G. M. 4-71 dieselized generating units are also in the engine room.

AMONG the dieselized equipment that the Tri-State Contracting Co. of Chipley is using on road construction is a Michigan #210 tractor scraper powered by a NTO6-BI Cummins turbo diesel engine rated 262 hp at a governed 2100 rpm speed. It has Clark 3:1 torque converter and Clark 4 speed full reversing transmission. A Michigan #280 with similar dieselized power is used for push loading.

FROM Allied Marine, for the 68 ft. commercial fishing craft, *Mako*, a 10 kw Onan generator powered by a model OM636 Mercedes-Benz diesel engine rated 36 hp at 3000 rpm.

POWERED by model HD277 Continental diesel engines, six model 800 Case Terratrac, for Cuban farms via Miami. These 4 cyl. 4x5½ diesels have 79 hp at 2400 rpm and have Roosa-Master fuel injection systems. Seven model 810 Case tractors with similar propulsion were also included in the shipment.

STATE Prison Farm at Belle Glade received a 125 kw Delco generating set powered by a General Motors 6-71 diesel engine for stand-by use. Standby units were also delivered to Stevens Markets of Miami (100 kw Delco G. M. 6-71) and a 150 kw unit to the First National Bank in Miami.

FROM Lee Motors in Fort Myers, three 220 cu. in. four cyl. Ford diesel engines rated 68 hp at 2400 rpm for celery spraying and harvesting machines on the Wedworth Farms near Lake Okeechobee. These diesel engines use the Simms fuel injection systems.

MISS ANNIE, a West Coast snapper boat, was recently repowered by a matched pair of Ford four cyl. marine diesel engines each rated 68 hp with 3:1 Paragon rkr gears and 26x24 propellers from Modern Diesel Power Co. of Tampa.

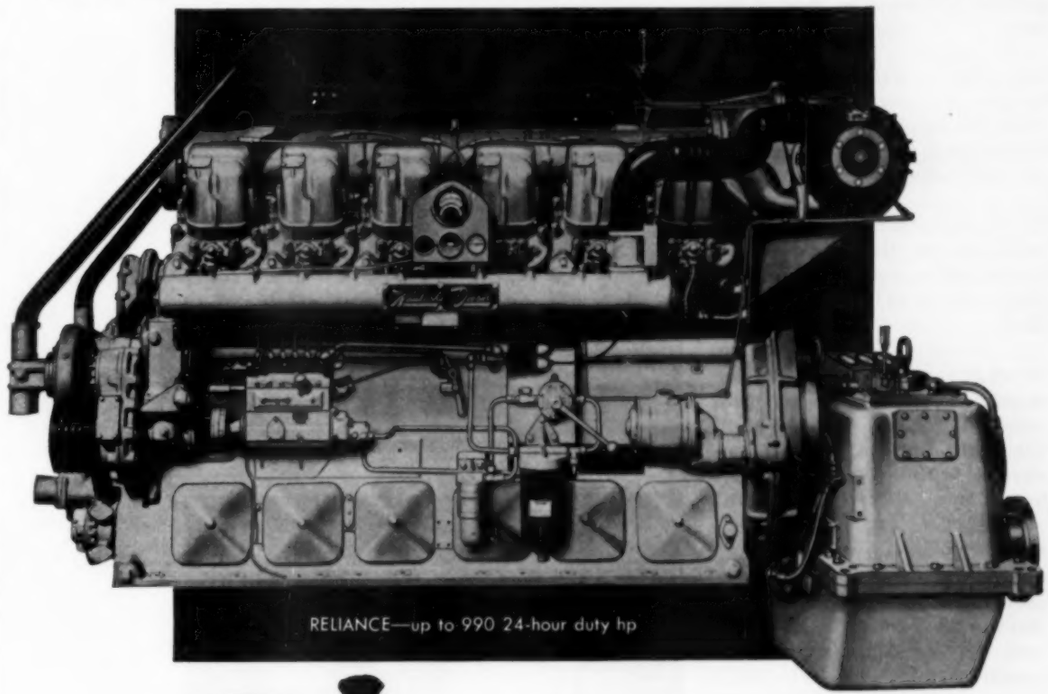
FLORIDA Georgia Tractor Co. in Tampa supplied a Galion road roller with the new International UD282 six cylinder diesel engine which has a max. hp of 95 at 1800 rpm, to the Brinson & Allen Construction Co. of Tampa.

THE 371 ft. *Cecile Erickson*, powered by four Caterpillar D397 diesels, (see Diesel Progress July 1957) had one of the model L26 Lorain crawler ¾ yd. cranes repowered with a Caterpillar D315 diesel engine rated 91 hp. These dieselized cranes are used in the handling of salt, the vessels main cargo.

Parker-Hannifin Distributors

Two firms have been franchised as distributors for Parker industrial tube fittings and Crown regulators, filters and lubricators by D. A. Cameron, general sales manager-distributors, Parker-Hannifin Corp. Alta Engineering Co., Englewood, Col., and Salt Lake City, Utah, will handle the line in that company's areas. Paul Locklin is head of Alta in Englewood and Kenneth Sigler is manager of the Salt Lake City branch. Louisiana Supply Co., Inc., Lake Charles, and Baton Rouge is the new Parker-Hannifin distributor in that area. The firm also has branches at Crowley and Morgan, La.

WAUKESHA



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RELIANCE	Normal	12	8½ x 8½	5788	725 horsepower @ 1215 rpm
	Turbo	12	8½ x 8½	5788	990 horsepower @ 1215 rpm
DEFENDER	Normal	6	8½ x 8½	2894	335 horsepower @ 1215 rpm
	Turbo	6	8½ x 8½	2894	510 horsepower @ 1215 rpm
WANDERER	Normal	6	7 x 8¼	1905	240 horsepower @ 1215 rpm
	Turbo	6	7 x 8¼	1905	315 horsepower @ 1215 rpm
RESOLUTE	Normal	6	6¼ x 6½	1197	195 horsepower @ 1600 rpm
	Turbo	6	6¼ x 6½	1197	290 horsepower @ 1600 rpm
VIGILANT	Normal	6	5¼ x 6	779	150 horsepower @ 1800 rpm
	Turbo	6	5¼ x 6	779	195 horsepower @ 1800 rpm
CUTWATER	Normal	6	4¼ x 5	426	100 horsepower @ 2000 rpm
	Turbo	6	4¼ x 5	426	120 horsepower @ 2000 rpm
NAVIGATOR	Normal	6	4 x 4	302	65 horsepower @ 2000 rpm
	Turbo	6	4 x 4	302	85 horsepower @ 2000 rpm

Michigan-Ohio News

By **Jim Brown**

CUMMINS Diesel Michigan Inc. of Dearborn, Mich. has announced the appointment of Russ Limer to the position of sales manager. Mr. Limer joined the Cummins organization in 1953 as service representative in Columbus, Ind. In 1954 he became export service manager for Cummins Diesel Export Co. and in 1958 was appointed service manager for Cummins Diesel Michigan Inc. Mr. Limer graduated from Purdue University with a mechanical engineering degree and now makes his home in Detroit.

WOLVERINE Tractor & Equipment Company of Detroit and Grand Rapids reports the sale of an International TD-9 bullgrader to the R. L. Coolsaet Construction Co., Dearborn, Mich.

EARLE Equipment Co. of Detroit recently sold an Allis-Chalmers HD6E crawler with a model 6BE hydraulic 'dozer to Orville T. Howe of St. Charles, Mich.

SCARLETT Gravel Co. at Holt, Mich. recently purchased a Pettibone-Mulliken model 240A equipped with a GM model 3-71 diesel engine rated at 105 hp. Sale was made by Cyril J. Burke, Inc. of Detroit.

MILLER Equipment Company of Livonia, Mich. reports the sale of a Michigan model 175A tractor-shovel. The new Michigan was purchased by Allied Concrete Inc. of Livonia, Mich. and is equipped with a 3¼ yd. bucket and a Cummins model JT-6-BI diesel engine.

THE village of Flushing (Mich.) has a new John Deere model 4401 diesel wheel tractor for their sewer and water department. The new tractor is equipped with a John Deere front-end loader and backhoe, and powered by a GM Diesel model 2-53 engine. Sale was made by the R. G. Moeller Co. of Detroit.

TELFORD Equipment Co. of Detroit recently sold an Adams model 440 grader with GM Diesel 4-71 engine to the Sanilac County Road Commission of Sandusky, Mich.

A HOUGH Payloader, model H-70 powered by a Cummins JF-6-BI engine was recently sold to Lakeview Excavating Co. of Mt. Clemens, Mich. Sale was made by Wolverine Tractor & Equipment Co., Detroit and Grand Rapids.

APPOINTMENT of Fred Dolton as national account representative for the "Michigan" line of construction machinery is announced by A. E. York, sales manager, Construction Machinery Division of Clark Equipment Co., Benton Harbor.

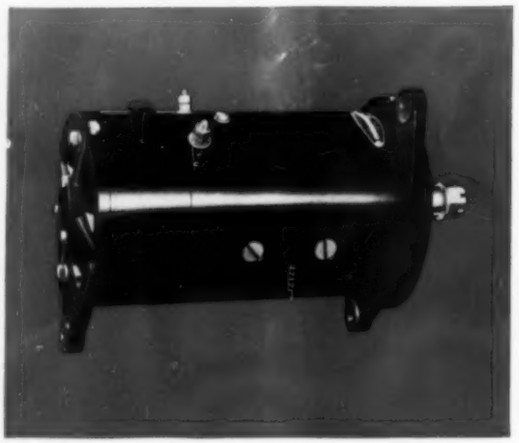
EARLE Equipment Co. of Detroit has announced the appointment of a new sales representative. He is Chuck Harris, and he will be covering the northern part of lower Michigan.

PIERSON Contracting Co. of Saginaw, Mich. has accepted delivery on a Michigan model 280 tractor-dozer. The new Michigan is powered by a Cummins NTO-6-BI engine and will be broken in on a relocation project of US-12 near Jackson.

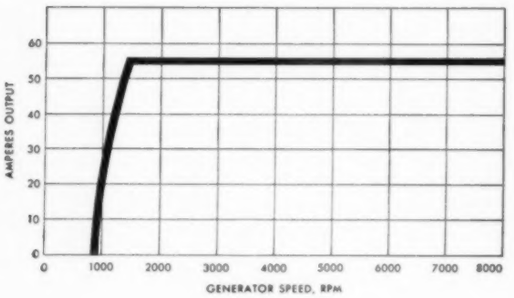
AN Allis Chalmers HD6E diesel tractor equipped with a 6BE hydraulic dozer was recently sold to James Sulaty of Marlette, Mich. The sale was made by Earle Equipment Co. of Detroit.

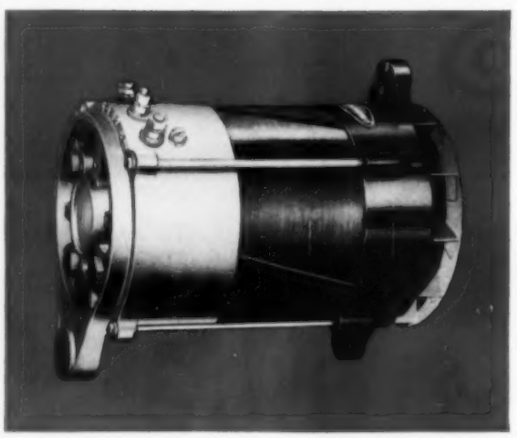
CUMMINS Diesel Michigan Inc. reports installation of an NH-180 Cummins diesel in a Ford model F-1100 tractor for Clifford Wallace of Coldwater, Mich. The installation was done with a 15 in. Lite clutch, standard Spicer model 6453A

TAILOR YOUR TRUCKS

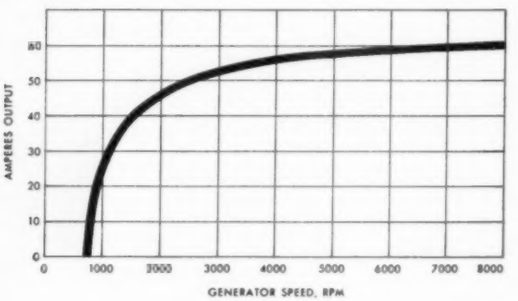


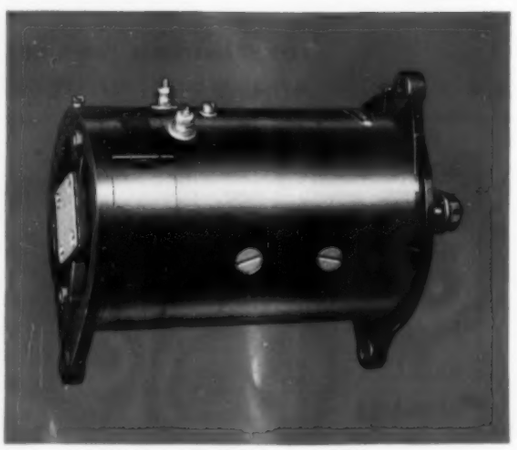
1106991 EXTRA-OUTPUT D.C. GENERATOR—12 volts • 55 amperes • 12 amperes at idle—For cross-country trucks, school buses and other vehicles with extra electrical equipment.



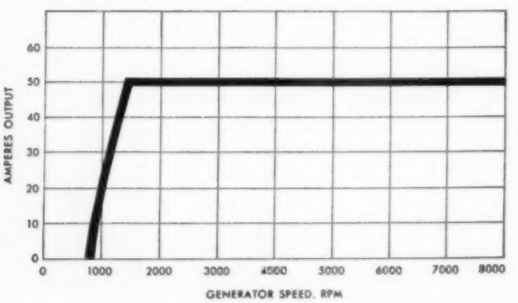


1117070 SELF-RECTIFYING A.C. GENERATOR—12 volts • 60 amperes • 27 amperes at idle—For high-duty vehicles with heavy electrical loads . . . operating at all speed ranges. Ideal for excessive low-speed operation and curb-idling.





1106985 EXTRA-OUTPUT D.C. GENERATOR—12 volts • 50 amperes • 14 amperes at idle—Short frame generator for difficult mounting applications. For vehicles in city and suburban use. Not for cross-country operation.



transmission and an Eaton 23000 2-speed axle with a ratio of 4.87 to 6.63.

HENRY Salvatore of Roseville, Mich. has accepted delivery on a Lorain model L56K combination crane and backhoe. The new Lorain was purchased from R. G. Moeller Co. of Detroit and is powered by a GM Diesel model 4-71 engine with torque converter.

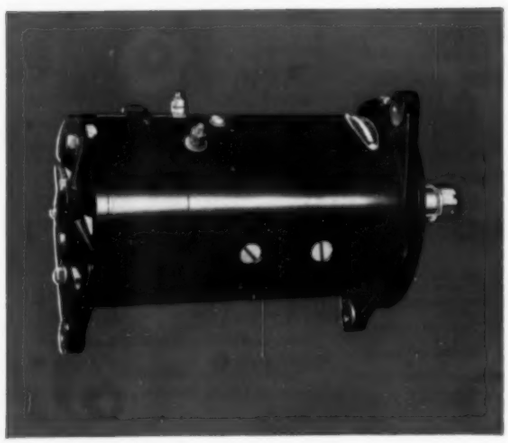
TELFORD Equipment Co. of Detroit recently sold a LeTourneau-Westinghouse model "C" Tournatractor to the U. S. Gypsum Co. of Alabaster, Mich. The new Tournatractor is powered by a model 6-71 GM diesel engine.

THE city of Detroit has accepted delivery on a Hough model H-70 Payloader powered by a Cummins diesel engine. The sale was made by Wolverine Tractor & Equipment Co., Detroit and Grand Rapids.

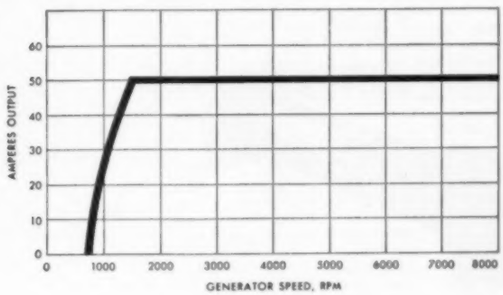
NATIONAL Gypsum Co. of Tawas, Mich. has purchased a Michigan model 175A tractor-shovel equipped with a 3¼ yd. bucket and powered by a model 4-71 GM diesel engine. Local distributor is Miller Equipment Co. of Livonia.

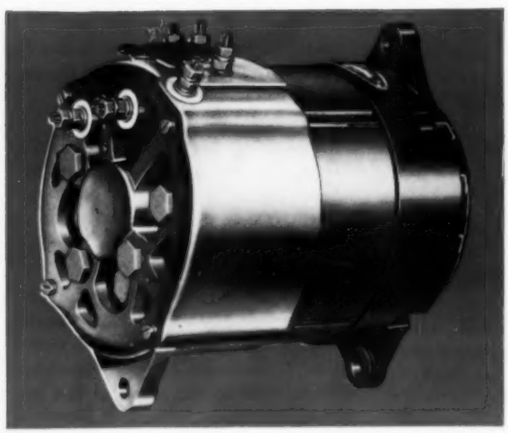
JOHN Myaard of Hudsonville, Mich. has accepted delivery on an International TD-9 bulldozer. The sale was made by Wolverine Tractor & Equipment Co., Detroit and Grand Rapids.

TO JOB CONDITIONS

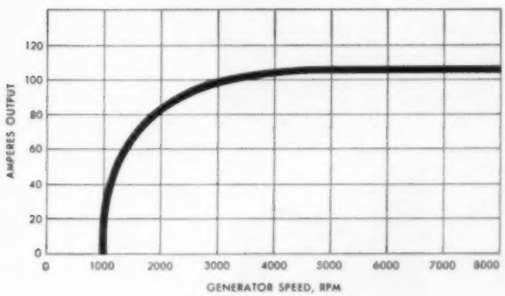


1106986 EXTRA-OUTPUT D.C. GENERATOR—12 volts • 50 amperes • 20 amperes at idle—For metropolitan trucks and school buses, with extra electrical equipment . . . operating at low speeds and with engine idling most of the time.





1117115 SELF-RECTIFYING A.C. GENERATOR—12 volts • 105 amperes • 10 amperes at idle—For high-duty vehicles with extra-heavy electrical loads . . . operating at all speeds. A.C. voltage available for 110 V conversion.



Delco-Remy offers a complete line of A.C. and A.C.-D.C. generators that are right for the job.

Demands on the electrical systems of trucks vary with their use. For best performance, whether the vehicles be new or already in service, the electrical equipment should be job-matched to meet those demands.

Do your trucks have extra electrical equipment? Operate cross-country, around town or off the road? Do they travel at sustained highway speeds, or with plenty of stop and go? Whatever their assignment, there are Delco-Remy extra-output generators and regulators job-matched to meet the electric power needs *exactly*.

Delco-Remy ELECTRICAL SYSTEMS

GM GENERAL MOTORS

FROM THE HIGHWAY TO THE STARS
DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

New Filter Identification

New Luber-finer Dieselpak models 500 and 750 are now attractively lithographed for easy identification. The gold trademark Luber-finer appears in 2-in. letters around the top and bottom of the Pack. The Dieselpak has been especially designed for use with H. D. detergent compounded oils, and may also be used with fuel oil and straight mineral oil. Complete information is available. Write Luber-finer, Inc., 2514 South Grand Ave., Los Angeles 7, Calif.

ITS NEW

Pre-Heaters for Heavy Fuel Oil

A complete line of heavy fuel oil electric pre-heaters, with thermostatic regulation of temperature, is announced by Vulcan Electric Co. The new line includes low density tail piece heaters, suction or return line heaters and circulation heaters in a wide range of models, wattage and voltage ratings. Vulcan tail piece heaters are made with either 2 in. NPT screw mountings or 4 in. bolt circle flanges. 1, 2, 3 and 5 kw units are available with dual control or single control thermostats. Temperature is controlled to plus or minus 5° F. Optional automatic wattage output drop on low fire or standby may be included. Units are interchangeable with standard types now in use. Larger models are available up to 36 kw, 208 to 550 volts, single or three phase, 3, 5 or 6 in. pipe flanges, with or without built-in thermostat. These may be ordered completely assembled in insulated shell and jacket, equipped with 2 in. inlet and outlet mounting brackets, ready for installation. For technical literature and prices, write to Vulcan Electric Co., 88 Holten St., Danvers, Mass. ITS NEW

Chief Hydraulics Engineer

Carl A. Brown, Vickers, Inc., industrial control division, Detroit, has been appointed chief hydraulics engineer at Minneapolis-Moline, James A. Miller, director of engineering, has announced. Brown, a native of Detroit, has broad experience in design, engineering and product development. He joined Vickers in 1935, designing hydraulic equipment for the U.S. Navy, including gun turret controls. From 1939 he was responsible for product design of hydraulic equipment for hoists, power transmissions, ammunition handling gear. In 1956 he was named assistant chief engineer of the industrial controls division of Vickers.

Split Flange Hose Fitting

A new split flange hose adapter fitting has just been added to the Weatherhead line of industrial hose and fittings products. The company states these new adapters eliminate the need for expensive hose ends and permit easy replacement of OEM hose assemblies for pump and valve connections with SAE flanged "O" ring outlets. Designed to use with a standard female swivel end, these new Weatherhead split flange hose adapter fittings are available in straight, 45° and 90° elbow styles, each in five standard sizes from ¾ in. to 2 in. tube size. For complete details, write The Weatherhead Co., Fort Wayne Division, 128 West Washington Blvd., Fort Wayne, Ind.

ITS NEW

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CAB HEATERS — Fusion-bonded cores for truck, bus and locomotive heaters designed for steam or hot water, using waste heat from the jacket water.
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OIL COOLERS — For mobile or stationary use. Single and multi-pass models. Fixed or removable tube bundles. Standard sizes for quick delivery.
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SUPERCHARGER INTERCOOLERS-AFTERCOOLERS — For high and low pressure systems, cooling compressed air between supercharger blower and the air manifold. Sea-water or fresh-water types.
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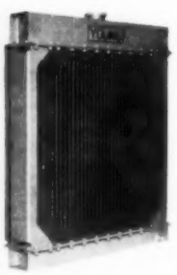
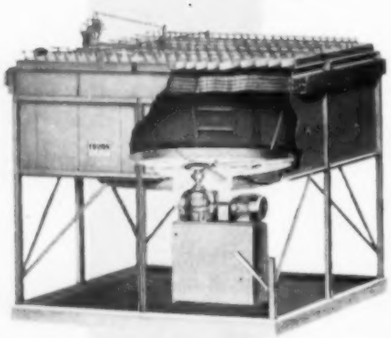


MONOWELD® RADIATORS — Heavy-duty, welded-steel construction. Replaceable single or multiple section cores. Capacities from 70,000 to 3,250,000 btuh.
Catalog 160



HORIZONTAL CORE HC® COOLERS — Deliver high volume cooling efficiency of vertical air discharge. In-line installations offer unlimited cooling capacities.
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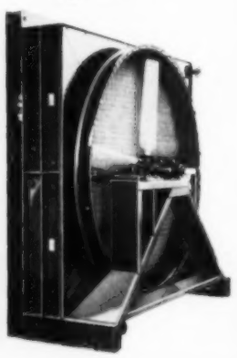

ENGINE JACKET WATER COOLERS Single or combination of jacket water and lube oil. Wide size range with capacities from 210,000 to 3,000,000 btuh.
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Young *ideas for solving heat transfer problems are GOOD IDEAS*

YOUNG RADIATOR COMPANY DEPT. A-400 RACINE, WISCONSIN
PLANTS AT RACINE, WISCONSIN AND MATTOON, ILLINOIS

Southwest Diesel Notes

By **Donald M. Taylor**

TENNESSEE Gas Pipeline Co.—a division of Tennessee Gas Transmission Co. is installing 112,850 hp in gas engine and gas-fired turbine compressor stations. The company has four new stations in Mississippi and Tennessee which will start operating soon. In addition, 13 of the company's existing stations have been enlarged. First, the line-up for the four new stations:

BAY St. Louis, Miss. compressor station being constructed by Tellepsen Petro-Chem of Houston, Tex. will have a total of 8000 hp. Four Ingersoll-Rand K V S's will supply 2000 hp each.

COLUMBUS, Miss. station will have a total of 7500 hp. Western Pipe Line, Inc. is the contractor, and the engines are Cooper-Bessemer GMWA-10's—each having 2500 hp.

COLLINWOOD, Tenn. compressor station will have 7500 hp. It is a duplicate of the station above so far as engines are concerned,—three Cooper-Bessemer GMWA-10's. Contractor is Western Pipe Line, Inc.

HEIDELBERG, Miss. another of Tennessee Gas Pipeline Co.'s new stations will have 8000 hp. Contractor installing the four Worthington SUTC-8's is Tellepsen Petro-Chem.

TENNESSEE Gas Pipeline Co. has some of the largest compressor stations in the world. Moreover, they are still growing. Almost every year some of the existing stations are enlarged. This year, the following stations are being increased:

ALBANY, Ohio station will soon have 6800 additional hp. Contractor, Arthur Brothers is installing two Clark TLA-10's—each having 3400 hp.

CAMBRIDGE, Ohio station will be 7500 hp larger after Petrocon, Inc. finishes expanding it with three Cooper-Bessemer GMWA-10's.

CARRELLTON, Ohio station horsepower is being upped 8000! Houston Contracting Co. is installing four Ingersoll Rand KVS's.

MERCER, Pa. station horsepower will be increased 2700 after Houston Contracting Co. finishes installation of two GMVA-10's of 1350 hp each.

NEW gas-fired turbine for Tennessee Gas Pipeline Co.'s Alexandria, La. station. Houston Contracting is adding one General Electric 6700 hp gas-fired turbine.

PIGEON, Pa. station is being enlarged by Houston Contracting Co. One 2000 hp Ingersoll-Rand KVS is being added to the existing station.

WINNSBORO, La. compressor station is being increased by two Clark HBA-8T's which have 2050 hp apiece. The contractor is H. B. Zachry, of San Antonio, Texas.

LAKE PROVIDENCE, La. compressor station horsepower is being increased by 8100! Contractor H. B. Zachry is installing three Clark TLA-8's of 2700 hp each.

IOLA, Miss. compressor station will be enlarged by three Cooper-Bessmer GMWA-10's of 2500 hp each. This additional 7500 hp is being installed by O. L. Olsen of Houston, Tex.

GRENADA, Miss. compressor station is being enlarged by the addition of a new General Electric 6700 hp gas-fired turbine-driven compressor. The contractor is O. L. Olsen.

NEW ALBANY, Miss. station will have three new Clark HBA-8T's adding 6150 hp to the station's total when Arthur Brothers finishes up construction.

SAVANNAH, Tenn. will have 7500 more hp after Houston Contracting Co. finishes installation of a new Westinghouse gas-fired turbine.

CENTERVILLE, Tenn. station will be increased 8100 hp after Western Pipe Line, Inc. finishes installation of three Clark TLA-8's which have 2700 hp apiece.

IN addition to the 112,850 hp installed above, Tennessee Gas Transmission Co.'s subsidiary company, Midwestern Gas Transmission Company completed a new 6000 hp compressor station near Portland, Tenn. This station near the origin of the line which runs from the Tennessee Gas Pipeline system to Joliet, Ill. has three Ingersoll-Rand KVS's. This new pipeline system has 350 mi. of 30-in. pipe line which brings natural gas to three of the companies which serve the Chicago area.

NEW AND NOW AVAILABLE! The completely new 1959 edition of the **DIESEL ENGINE CATALOG,** Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG,** 816 N. LaCienega Blvd., Los Angeles 46, Calif.

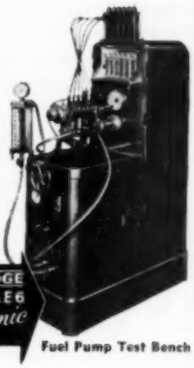
The perfect trio...

. . . for the Diesel repair shop. Provides the necessary equipment for running essential tests on injection units and for re-conditioning injector nozzles.

Write for details today on utilizing this perfect trio for outfitting the smaller service shop at moderate initial cost—or on adapting the units to speed service techniques in any repair shop.

Universal Nozzle Analyser

Meets every demand of fast, accurate nozzle testing. Permits precise observation of entire nozzle action and spray pattern. Single dial records time and pressure readings. New injector receiving clamps eliminate pipe connections.



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Hartridge Nozzle Grinding & Lapping Machine

Insures perfectly concentric nozzle bodies and needles with a fine finish. Its immense scope, speed and ease of operation cut nozzle servicing costs.

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Only with this VIKING "288" PUMP

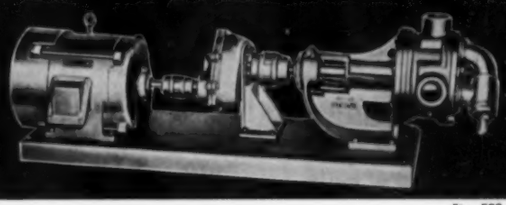

Fig. 288

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POSITIVE When we say "POSITIVE", we mean pumps that are completely self-priming and capable of stripping tanks dry.

SMOOTH By "SMOOTH" we mean pumping without pulsation and irregular flow that can cause damage to valves, fittings, meters, etc.

QUIET OPERATION And to top it off, these "288" Viking Pumps with completely enclosed helical gear reducers are the last word in "QUIET" operation.

17 to 164 G.P.M. SIZES

For More Information, Send Today for Catalog D, page 27-28

VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, It's "ROTO-KING" Pumps
See Our Catalog in Sweet's Industrial Construction and Plant Engineer's File

PEAK ENGINE EFFICIENCY... GREATEST FUEL ECONOMY with the KORFUND PI-METER

PERFORMANCE METER FOR ALL GAS, DIESEL AND STEAM ENGINES

Now, without charts, graphs, delicate instruments or tedious computations ...get the true picture of cylinder performance and pressures! Anyone can balance cylinder outputs quickly and easily with the **KORFUND PI-METER** by reading mean pressures directly on the meter's large dial.

You'll get smoother performance, greater efficiency and fuel economy, and longer engine life because each cylinder's output will be accurately balanced.

✓ CHECK THESE EXCLUSIVE KORFUND PI-METER FEATURES:

- ✓ Positive detection of load unbalances
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Sold on a satisfaction guaranteed basis. Supplied in a polished mahogany case, 9½" x 8½" x 4".

Accessories include a lubricating pump and service tools.

For details on how you can improve engine efficiency and reduce fuel costs with the PI-METER, write for free Bulletin #71

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48-20B Thirty Second Place • Long Island City 1, New York

Mid-West Diesel News

By **L. H. Houck**

TEXAS Bitulithic Co., Dallas, now has 11 Michigan tractor shovels, 80 hp, 1¼ yd. model 75A's with Cummins diesels.

JEFFERSON City Diesel Co., Inc., Jefferson City, Mo., Hutton Machinery Co., Marion, Ill., and Illinois Contractors Machinery, Inc., Elmhurst, Peoria and Rock Island, Ill., are dealers for LeTourneau-Westinghouse equipment.

CONVERSIONS from gasoline to diesel are going on all around since the introduction of the new 53 model GM diesel. Hicklin GM Diesel, Inc., Des Moines, Ia., reports installing a 4-53 GM diesel in a Chevrolet model 10400 tandem truck owned by Myers Brothers Construction Co., Fort Atkinson, Ia. The truck is used for hauling heavy construction equipment over the highway and has a gross weight of 94,000 lbs. Spicer fifth direct transmission and 7.67 rear axle were not changed due to high rpm of engine. There are several other similar conversions under way.

GH. Boers Equipment Co., Metamora, Ill., has been appointed Euclid dealer for Central Illinois. They will handle dumps, scrapers and crawler tractors made by Euclid.

INTERNATIONAL TD-15 with dozer has been delivered to J. W. Couch, Perry, Mo., for general contracting work. Mo.-Ill. Tractor Co., handled details.

MUNIE Gravel Co., Keyesport, Ill., recently took delivery on a TD-15 with Drott loader from Mo.-Ill. Tractor Co., St. Louis.

WEYMEYER Mining Co., Rosebud, Mo., have added two Hough Model 12, with Hough torque converters and International diesel engines, to its fleet.

THE pioneer Zephyr, the nation's first dieselized streamlined train, owned by the Burlington railroad, has passed the quarter century mark. It has carried more than one million passengers 3,200,000 miles and may be withdrawn soon and put on permanent public exhibition.

STEINBERG-BOYD Construction Co., Broken Arrow, Okla., installed a new 4-71 GM diesel in a model 25 Northwest shovel in their quarry near Nowata, Okla., which supplies aggregate for its $674,983.31 contract for highway relocation work in the Oologah dam area.

DEALERS for Trojan tractor, made by Yale & Towne, report the new 3 cu. yd., 4 wheel drive, pneumatic tires, model 304, now comes with 4-71 GM diesel engine. Moody Equipment & Supply Co., Little Rock, Ark., is a new Trojan dealer.

DOBBS GM Diesel, Inc., has built a $100,000 plant in Denver for the sale and service of GM diesels. O. L. Dobbs, who received the GM distributorship last December is head of the firm. New facilities are at 5840 Colorado Blvd.

ADAMS Contractors Equipment Co., Rockford, Ill. is a new dealer for the Oliver line of tractors—wheel and crawler—with diesel engines.

HARDWICK-Ingram Construction Co., West Memphis, Ark., has a new 30-B Bucyrus-Erie dragline working on its $2 million Little Rock sewer job, with a 4-71 GM diesel engine.

L. H. LOVE & Son, Louisiana, Mo., has purchased an International HD-6 with Drott loader from Mo.-Ill. Tractor Co., St. Louis.

MUNIE Gravel Pit Co., Keyesport, Ill., has purchased a second P & H model 155A shovel for use in their aggregate operation. The new machine is equipped with a P & H diesel. Sale by Mo.-Ill. Tractor Co., St. Louis.

INLAND GM Diesel, Inc., Milwaukee, report repowering a Cedarapids Commander with a new 6-110 GM diesel for the owner, Linck-Henes Co., Beaver Dam, Wis.

PETERSON Builders of Sturgeon Bay, Wis., have taken delivery on four 12V-71 GM diesels from Inland GM Diesel, Inc., Milwaukee. These 456 hp units will be used for 65 ft. aluminum hull crew boats under construction.

HILLSIDE Transit Co., Milwaukee, has taken delivery on another GM 4-53 diesel for installation in a White 300 tilt-cab truck. Delivery was made by Inland GM Diesel, Inc.

HUGO Meyer, Rosebud, Mo., has purchased a Hough model 12 Payloader with International diesel and Hough torque converter, for use in clay mining, from Mo.-Ill. Tractor Co., St. Louis.

INTERNATIONAL TD-20 with dozer to Hicks & Rogers, Philadelphia, Mo., for use in construction contracting, from Mo.-Ill. Tractor Co., St. Louis.

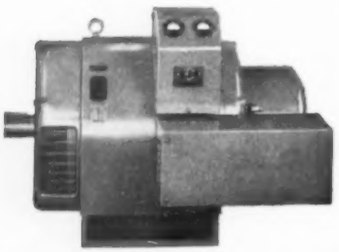
If you hate maintenance, you'll like **E-M's** *new*

BRUSHLESS

"Packaged" Generator

BEMAC

(Brushless Excited Magnetic Amplifier Controlled)



BEMAC is available in ratings of 10 thru 150 kw, 3 phase; 10 thru 100 kw, 1 phase; 1200 and 1800 rpm; 0.8 PF; 60 cycles; broad-range voltages of: 120/208-139/240 and 240/416-277/480 volts, 3 phase; 120/240 volts, 1 phase.

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NO SLIP RINGS!
NO BRUSHES!

Here is a generator that is *practically maintenance-free*. It requires no servicing other than an occasional bearing check. Efficient, reliable, ageless silicon diodes rectify the exciter a.c. to d.c., eliminating the need for commutators, brushes, and slip rings. There are many advantages:

Better suited to dusty, corrosive atmospheres. No electrical parts subject to wear and damage from dust and dirt.

Safer in hazardous atmospheres. No moving electrical contacts. Sparking is eliminated.

Easier to operate. No complicated adjustments—anyone can operate BEMAC.

Magnetic amplifier regulated. Voltage regulation is automatic. A unique static voltage sensing circuit gives ±2% regulation.

"Rock-Steady" voltage makes your motors, lights, and electronic equipment work better.

Starts big motors. Built-in voltage boost transformer makes big motor starting easier.

Simple to install. BEMAC is self-contained, completely factory assembled.

● *Publication 255 tells how BEMAC Generators work. Write for a free copy and call your E-M Field Engineer.*

ELECTRIC MACHINERY MFG. COMPANY
Minneapolis 13, Minnesota

2100-TPA-2150

The Originators of "Packaged" Generators

SIMPLICITY
in the Heart of the Modern Diesel Engine

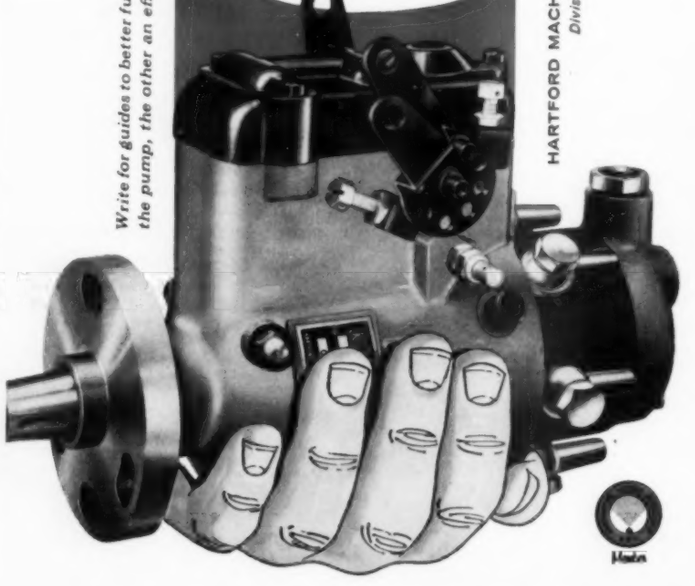
Simple—Only 8" long, 3¼" wide, 5½" high . . . weighs less than 10 pounds . . . fewer parts to service, fewer adjustments to make.

Versatile—Because of accessories that can be built in or added at low cost taking up no, or very little, valuable engine block space.

Economical—Initial cost is less, costs less to service, saves money because of its dependable service.

HMS makes good diesels better

ROOSA MASTER



Write for guides to better fuel injection. One features the pump, the other an efficient, economical filter.

HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
Division of Standard Screw Company

Will Build Fruit Express Diesel Generator Units

Stewart & Stevenson Services, Inc. soon will be participating in a program to take the drip out of refrigerator cars. The Houston-based company has been engaged to build 300 diesel generator units which will provide electric power for the operation of refrigerant equipment on new Pacific Fruit Express Co. rail cars. Joe Manning, Stewart & Stevenson Services vice president and general manager, anticipates that work on this project will get under way early in 1960, timing to depend on the availability of steel. The technique of using electric-powered mechanical refrigerant equipment has been used successfully for several years and replaces the venerable system of ice-bunkered cars. The Stewart & Stevenson units will be designed to operate 21 days unattended. Unattended operation will be controlled under variable weather and climatic conditions by an automatic system designed by Stewart & Stevenson.

Western Gear Sales Engineer

Mr. Robert Geiger has been newly appointed by Western Gear Corp. to serve as a sales engineer out of the company's Chicago office. Mr. Geiger, a graduate engineer with a substantial background of experience in the gear industry, will represent the Industrial Products Division of Western Gear Corp., selling its line of gearmotors, speed reducers, high speed units as well as custom engineered machinery. The Chicago office of Western Gear Corporation is located at 122 South Michigan Ave., Room 814, Chicago, Ill.

Hose Fittings Finder

A new four page folder contains information for selection of industrial hose and fittings to match to hydraulic pressures and other operating conditions. Five types of reusable fittings in a variety of ends are illustrated. For assemblies with permanently attached ends, 13 kinds of hose and 13 different ends are shown. Also presented are hose fitting adapters and hose assembling equipment. Ask for Bulletin 4406B1 from W. O. Murray, Parker Fittings & Hose Division, Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, Ohio.

ITS NEW

New Piston Ring Foundry

Plans for a new $3 million piston ring foundry near Rushville, Indiana, have been announced by Perfect Circle Corp. A one-story structure of 80,000 sq. ft., the fully-mechanized plant will have three times the capacity of the present foundry at Rushville which it will replace. Construction on an 80 acre site is to begin as soon as practicable, according to Perfect Circle President William B. Prosser who said an opening date for late 1960 is contemplated. On completion, the new plant will house the latest in production equipment for foundry operation. The Rushville foundry and the firm's foundry at New Castle, Indiana, make piston ring castings and small precision castings for the automotive industry.

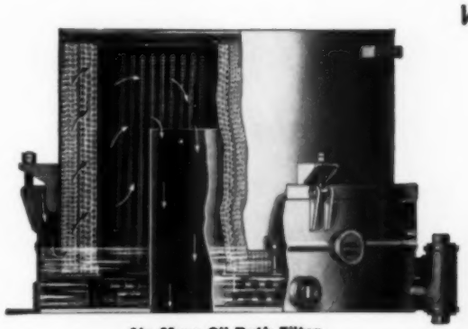
Vice President Appointed

Appointment of W. Blake Dodds as vice president and general manager of The Perfect Circle Co., Ltd., Don's Mills (Toronto), Canada, has been announced by C. E. McTavish, president. Prior to assuming his new position, Dodds was vice president and assistant general manager.

NEW AND NOW AVAILABLE! The completely new 1959 edition of the **DIESEL ENGINE CATALOG,** Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG,** 816 N. LaCienega Blvd., Los Angeles 46, Calif.

longer life for your diesel locomotives

with cleaner intake air from AIR-MAZE Oil Bath or Panelbath Filters



Air-Maze Oil Bath Filter
Efficient filtration with low maintenance.

Air-Maze Panelbath Filter
Effective filtration at low initial cost.

Which should you use? *One or both of these Air-Maze filters is the economic answer to your locomotive fleet requirements. Evaluate the advantage of each filter under your operating conditions.*

OIL BATH FILTER—Removes up to 97% of objectionable dirt... has exceptionally high dirt-holding capacity... requires only semi-annual oil changes and annual removal for cleaning.

PANELBATH FILTER—Removes up to 90% of objectionable dirt. Designed to up-grade panel filtration of intake air, the PANELBATH has low initial cost... replaces 2" and 4" oil-wetted or centrifugal type panels on engine air intakes. Requires periodic servicing at 90-day intervals under average operating conditions.

Replaces panel filtration with resultant efficiency at least equal to that replaced.

The basic principle used in both these Air-Maze filters is backed by successful service on over 4000 locomotives.

For further information, contact your locomotive builder or write Air-Maze Corporation, Dept. DP-1, Cleveland 28, Ohio. (Subsidiary of ROCKWELL-STANDARD Corp.)

AIR-MAZE *The Filter Engineers*

Subsidiary of **ROCKWELL-STANDARD** Corp.

ENGINE AIR FILTERS • CARBODY FILTERS • SPARK ARRESTERS • LUBE OIL STRAINERS • OIL SEPARATORS • PASSENGER CAR FILTERS

NOW—ROLLING ON THE HIGHWAYS...

SETTING NEW STANDARDS FOR

THE GM DIESEL ALL-PURPOSE POWER LINE
20 to 1650 H.P.
in only 3 cylinder sizes

NEW		NEW		NEW		NEW
"2-53" 20 to 47 H.P.	"2-71" 33 to 67 H.P.	"3-53" 38 to 97 H.P.	"3-71" 51 to 118 H.P.	"4-53" 51 to 130 H.P.	"4-71" 69 to 167 H.P.	"6V-53" 76 to 195 H.P.	"6-71" 112 to 252 H.P.

Series 53 and 6V-71 "Jimmy" Diesel Engines

TRUCK REPOWER SAVINGS

Get ready to throw away the yardsticks you've always used to measure the performance and economy of your truck engines.

Get set for some eye-opening figures on power-to-weight ratios, operating costs, mileage records, maintenance and overhaul costs.

Go to your GM Diesel Engine distributor and take a good close look at the "6V-71" and Series 53 "Jimmy" Diesel engines that are setting new standards for truck repower savings and performance.

Running big rigs? Then either the "in-line" or "6V-71" is the baby for you. The "6V-71" delivers a high torque 217 horsepower at 2100 rpm—enough to beat the schedules and top the loads you haul now.

It's over a foot shorter—200 pounds lighter—than "in-line" Diesel sixes of the same horsepower. It's the *only* 217 H.P. Diesel that will fit the shortest b.b.c. truck-tractor, and can haul more with a minimum of fuel.

You know the big savings Diesels have brought to cross-country haulers—now those same savings are brought to small trucks, too. The 97-130 H.P. 3- and 4-cylinder Series 53 "Jimmy" Diesel engines fit 15,000 GVW to 40,000 GCW trucks. They can step in and repower gasoline trucks from 1½ tons up—cut operating costs 30% to 50%.

They're doing just that right now for many truckers—slashing fuel bills, boosting payloads, improving performance—giving truckers savings and profits they've never come close to before.

Before you spend another nickel buying or repairing your engines—better take a look at these proven "Jimmy" Diesels. You'll find they set a new truck power savings standard that means money in the bank for you. Call us—we've got the proof.

GM DIESEL

DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide

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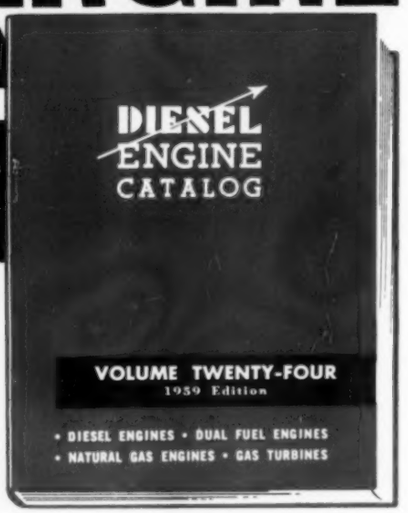

LOOK AT THE CONTENTS!

1. **ENGINES** – All major manufacturers of diesel, dual fuel, natural gas engines and gas turbines are represented in multiple page sections. Text is supplemented with specifications, power curves, photographs and sectional views.
2. **TURBOCHARGERS and SUPERCHARGERS** – This section of manufacturers is detailed and fully illustrated to give complete information on this increasingly important phase of the industry.
3. **TRANSMISSIONS** – The latest information on torque converters, fluid drives, and other modern means of transmitting power are fully described and illustrated in this section.
4. **ACCESSORY EQUIPMENT** – Recent developments in fuel injection systems, governors, and other key accessory units are detailed and illustrated fully in this section.
5. **MARKET PLACE** – A convenient, time-saving listing of sources from which you can obtain the multitude of items and services needed by the fast growing Diesel Industry.
6. **ADVERTISING** – Leading manufacturers of engines, accessories, and services bring out the important features of their products in attractive, easy to read advertisements to further enhance the reference value of the CATALOG.

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$10.00 per copy (plus state sales tax when delivered in California). When ordering from Sterling Areas, remit £4:0:0 to DIESEL PROGRESS, St. Paul's Corner, Ludgate Hill, London, E.C.4.

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GM Detroit Diesel Promotions Are Announced

R. F. Prussing

L. H. Wells

Robert E. Hunter, General Sales Manager, Detroit Diesel Engine Division, announced the appointments of Lauren H. Wells as assistant general sales manager in charge of home office staff activities, and Raymond F. Prussing as assistant general sales manager in charge of field activities. Both of these are new positions required because of the division's expanded diesel engine volume. Mr. Wells formerly served as manager of sales engineering, and Prussing was executive assistant to the managing director of foreign distributors division, General Motors Overseas Operations in New York. Mr. Wells who attended the University of Wisconsin and Wayne State University joined General Motors in 1937 in the diesel engine design group of GM Research. Later with the newly formed Detroit Diesel Engine Division he served in various engineering department positions. Following a tour of duty in the South Pacific as a service technician to the U.S. Navy, he transferred to the sales department in 1945. After serving in various home office and field sales positions he became head of sales engineering in 1955. Mr. Prussing, educated in New York, started his business career with a GMC truck distributor. During World War II, he served with the 8th U.S. Air Force in England, following which he joined the foreign distributors division of General Motors Overseas Operation, where he gained experience in the sale of many of the corporation's non-vehicle products which included GM Diesels, Allison, Electro-Motive and Delco. As executive assistant with foreign distributors division he was in charge of sales of these products as well as Frigidaire sales and service.

Houdaille Appoints Boehm Manzel Division Manager

Eric G. Boehm

Ralph F. Peo, chairman of the board of Houdaille Industries, Inc., has announced the appointment of Eric G. Boehm as general manager of the Manzel Division in Buffalo, N. Y. Boehm has been associated with Houdaille and its predecessor companies for more than 20 years in various management and production-executive capacities. He was formerly general manager of the Buffalo Hydraulics Division in Buffalo, and more recently general manager of the Buffalo Bolt Division of the Buffalo-Eclipse Corp. in North Tonawanda, N. Y. Manzel manufactures automatic force-feed lubricators, chemical metering equipment, slurry pumps and hypochlorinators.

New Water Pump Impeller

A new water pump impeller with a ceramic seal face, when combined with an improved automatic shaft seal, is said to eliminate the most frequent cause of water pump leaks in truck and other heavy-duty engines. The combination is designed to withstand the most adverse conditions, including intermittent operation, highly corrosive water, wide temperature variations, and high pressures. Interchangeable with original impeller and shaft seals in most standard water pumps, the units are made by Schwitzer Corp., 1155 Massachusetts Ave., Indianapolis 7, Ind. The impeller is known as the Hy-Duty water pump ceramic nose impeller. Its ceramic washer is permanently bonded to the impeller casing under controlled heat and pressure. No extra space is required by the washer since the impeller face is counter-bored. Identified as model J-2, the automatic shaft seal has a molded carbon alloy washer which makes contact with the impeller's ceramic washer. Since both contacting surfaces are of inert materials, corrosion and deterioration at these critical areas are practically eliminated. Both units are available only in production quantities. (ITS NEW)

Cooper-Bessemer Pittsburgh Manager

Appointment of J. M. Brannaman to the post of branch manager is announced by George Edick, sales manager, domestic division, of The Cooper-Bessemer Corp., Mount Vernon, O. In assuming his new duties as Branch Manager, Brannaman will initiate the newest Cooper-Bessemer field office, 431 Union Trust Building, Pittsburgh 19, Penn. This office, under the direct supervision of F. M. Devin, vice president and district manager, will handle sales and engineering contacts in the territories of eastern Ohio and western Pennsylvania. Establishment of the Pittsburgh office is the latest step in providing the best possible direct association between Cooper-Bessemer engineering and sales facilities with operators of compressors and engines used for gas storage and transmission, gas processing and all stationary and mobile power services, Mr. Edick points out. A graduate in Mechanical Engineering from Stanford University, Brannaman was associated with American Potash and Chemical Corporation, Trona, California, before joining Cooper-Bessemer. In the past years, he has worked from Cooper-Bessemer's Mount Vernon branch office.

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FREQUENT REPLACEMENT
is required
INSIST ON M-C-M
chrome plating

Our customers tell us they have never seen a better job of Hard Chroming. We can prove it to you, too!

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SEE OR CALL US NOW!

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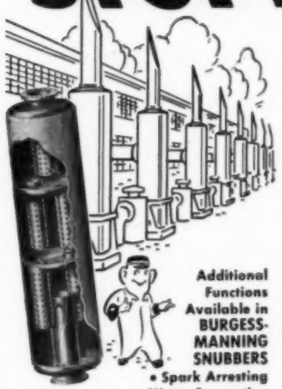
901 S. E. 29th P. O. Box 4485
Ph. ME 7-2449 • Oklahoma City, Okla.

New Rust Solvent

A new formula, fast acting penetrant and rust solvent has been announced by Spray Products Corp. "Spray Nuts-Off" is a combination of oils, penetrants and rust solvents formulated to provide fast solvent action and penetrating properties. It is packaged in a 12 oz. aerosol container to eliminate spillage and evaporation and is also available in pint and gallon containers. "Spray Nuts-Off" is designed to loosen everything rusted or corroded, according to the manufacturer. It can be used to clean small parts and will loosen stud bolts in aluminum heads and free corroded tail pipes and mufflers. It is sold by dealers throughout the country. For further information write Spray Products Corp., Box 44, Camden 1, N. J. (ITS NEW)

EXHAUST NOISE STOPPED!



Stop nerve-wracking, efficiency-destroying exhaust or intake noise. Your engine can be effectively silenced with Burgess-Manning Snubbers.

Don't tolerate this costly nuisance that leads to problems of impaired employee and neighbor relations, liability claims, losses in efficiency and production mistakes.

Burgess-Manning engineers specialize in the elimination of noise, and of dangerous pulsation-produced vibration in closed gas piping systems. Tell us your problem—we will gladly recommend a solution.

Additional Functions Available in BURGESS-MANNING SNUBBERS
• Spark Arresting
• Water Separation
• Heat Recovery
• Air Cleaning

BURGESS-MANNING COMPANY
Sound Engineering Industrial Silencer Division
9211 Sovereign Row, Dallas, Texas
Libertyville, Ill.

SAFE DEPENDABLE GENERATOR OPERATION

Spark Free! EXPLOSION RESISTANT

Adaptable To Any Industrial Engine!

Kato's complete line of 50, 60 and 400 cycle revolving field AC Generators is now available in brushless design.

Especially desirable for operation in gaseous environments.

GREATLY REDUCED MAINTENANCE!

KATO BRUSHLESS AC GENERATORS

60 CYCLE SIZES
3 Phase: 5 to 400 KW
1 Phase: 5 to 150 KW

SPEEDS
720, 900, 1200, 1800 RPM.

Take your choice throughout the Kato Line—Brushless or standard slip ring types. For all your 400 cycle or power converting needs investigate Kato's complete line of high frequency alternators and motor generator sets. Complete control systems for all Kato products include Kato magnetic amplifier voltage regulators, static exciters and motor starters for synchronous or induction motors.

BUILDERS OF FINE ROTATING ELECTRICAL MACHINERY SINCE 1928

NEW BRUSHLESS GENERATOR CATALOG
Write For It Today!

KATO ENGINEERING COMPANY
1443 1st AVENUE, MANKATO, MINNESOTA—PHONE 8-2941

Burgess-Manning Silencer Division Expands Sales Representation

The Burgess-Manning Co., Industrial Silencer Division, engineers and manufacturers of a broad line of standard and special intake and exhaust silencers announces expansion of sales activities in the appointment of four new representatives: The Barth Engineering Co., Oakland, Calif., has been appointed for the northern part of California and Nevada except Clark County. Sales in the mountain states of Colorado, Utah, Wyoming, Montana, Idaho, western North Dakota and Kimball and Cheyenne Counties in Nebraska will be handled by E. N. Murray Co., Denver, Colo. Adams Engineering Sales, Decatur, Ga. has been appointed for Georgia and the southern part of South Carolina. Northeastern Ohio including the counties of Ottawa, Hancock, Allen, Hardin, Marion, Morrow, Knox, Ashland, Wayne, Stark and Columbiana will be covered by the Carlson-Rutledge Co., Cleveland, Ohio.

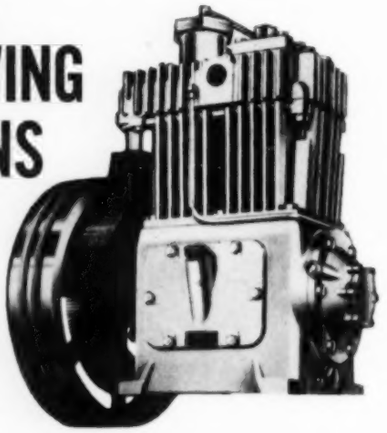
The companies named will handle all sales in their respective territories. Requests for general information should be sent to the Dallas, Texas, headquarters of the Industrial Silencer Division of Burgess-Manning Co., Dallas 35, Tex.

Sales Manager Appointed

Mr. George W. Clapp of Canton, Mass. has been promoted to sales manager of United Electric Controls Co., Watertown, Mass. it was announced by S. T. Herr, Vice President. Mr. Clapp has been with U. E. since 1951 and was a sales engineer and account manager for the manufacturer of temperature and pressure controls prior to his selection as sales manager. Originally from Quincy, Mass., Clapp saw military service in France and Germany during World War II. He is a graduate of the University of Miami engineering college.

starting power . . .

FOR MOVING MOUNTAINS



Quincy COMPRESSORS

When the job is earth-moving, Quincy Compressors are there to start the big diesels for the day's work. Air power delivered by Quincy is low cost, dependable.

Service is available across the country—around the clock.

Models from 1 to 90 CFM. *Write for catalog.*

QUINCY COMPRESSOR CO., Dept. DP160, Quincy, Ill.
Makers of the World's Finest Air Compressors

Inland River Reports

By **A. D. Burroughs**

TWO D-397 turbo-powered Caterpillar engines supply the rated 1300 hp for the new *Leta Jane*. The 83 x 26 ft. towboat, completed by Greenville Barge Construction Co., Greenville, Miss., is in action for M & M Towing Co., Greenville.

ELLIS Towing Co., Galveston, Texas, has accepted delivery of a new 40 x 18 ft. switchboat from builder, Bludworth Shipyard. Propulsion is supplied from two GM model 6-71 engines rated at 200 hp each.

THE first triple-screw towboat for the Humboldt Boat Service yards, St. Louis is under construction for Richards and Sons, Inc., Pomeroy, Ohio. The 57 x 22 ft. craft will be equipped with three GM 6-71E engines for main push-power.

ORY-B, a completed product from the Humboldt yards, is in service for owners Ory Bros. Machine and Iron Works, Wood River, Ill. Similar to the recent towboat delivered to Dairyland Power Coop, Alma, Wis., the craft is powered with a pair of GM 6-110 engines.

A 3000 hp Nordberg unit will be installed on the *J. R. Sensibar* by Christy Corp. Owned by Columbia Transportation Division, Oglebay Norton Co., Cleveland, Ohio, the 530 ft., 43-year-old steamer is being converted to diesel as part of a complete rehabilitation assignment.

HAGAN Towing Co., Harvey, La., is operating their new towboat, *Rebecca C.* The 60 x 20 ft. craft, completed by Greenville Barge Construction Co., is powered by two GM diesel engines developing 275 hp. Auxiliary power comes from two 15 kw Kohler diesel electric generating sets.

T. G. KEENEY is the name of the fifth fleet addition for T. G. Keeney Sons, river contractors at Witcher, W. Va. The new 72 x 17 ft. towboat has 420 hp delivered from twin Cummins engines.

THE *Nina F*, renamed the *Kathleen K.*, has been purchased from Jack Neilson, Inc., New Orleans as flagship for a new towing firm, M. V. Kathleen, Inc., Cincinnati. A rated 700 hp is supplied by two Caterpillar engines.

RONNIE M is the new name for the familiar *Connie C. Cenac*. Built in 1953, the 58-ft. GM-powered hawser tug has been purchased from Cenac Towing Co., Houston by A. G. Middleton and Sons, Inc., Houston, Texas, for service in the Houston ship channel.

GEORGE Engine Co., Inc., Harvey, La., supplied twin GM engines, rated at 308 hp each, for the new all-aluminum launch from Seward Seacraft, Inc., Morgan City, La. The craft is scheduled for South American service on Lake Maracaibo.

CURRENT construction projects at the busy yards of Superior Boats, Inc., Greenville, Miss., include a 3200 hp towboat designed by Friede and Goldman, Inc., New Orleans. A pair of GM engines, rated at 1600 hp each, will power the 130 x 37 ft. vessel.

PROOF of the power the *Theresa Seley* gains from her two Nordberg Supairthermal engines was evidenced with the news-making tow weighing more than 46,000 tons, bulk cargo, up the Mississippi. The still-new 200-ft. 6,000 hp towboat is operated by A. L. Mechling Barge Lines, Joliet, Ill., for Ormet Corp.

FEDERAL Barge Lines' *United States* was downbound on the Mississippi with a sizable tow, some 35-thousand tons loaded on 18 barges. This 1958 product from St. Louis Ship has a rated 8500 hp from four Cooper-Bessemer engines.

THE *United States*, heralded as the most powerful inland river boat, will have a twin-ship in the near-future. Federal Barges Lines, St. Louis, will add to its fleet a second, and reportedly identical, 8500 hp quadruple-screw diesel towboat.

JOHN HENRY will be the name for the new towboat under construction at Greenville Barge Construction Co., Greenville, Miss. The 1300 hp vessel is scheduled for service with the fast-growing Arrow Transportation Co. fleet, Sheffield, Ala.

Enterprise Production Manager

David Ury has been named manager of Production planning at Enterprise Division, General Metals Corp. in San Francisco. John H. Sheusner, manager of operations, who made the appointment, stated that Ury has been in the diesel engine business since 1929, and has had extensive experience in production, and inventory control. Ury, a native Oaklander, was formerly manager of service parts.

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West Coast News

By James Joseph

FOR Owen C. Carter's 62 ft. motor cruiser *Minn-Flicka*, berthed at Newport Beach, Calif., two Volvo KMD-69 diesel engines, 175 hp at 1800 rpm.

TO Utah Construction and Mining Co., San Francisco, to convert and repower a Hyster 2A80 lift truck, a GM diesel 4-53 engine, sale by Williams and Lane, Inc., Berkeley.

BILLINGS, Montana's Strever Construction Co. has installed a GM 8V-71 as power on a secondary Pioneer crusher at company's Saltese, Mont. plant. Engine, replacing an in-line diesel, uses a 4:1 belt-drive. Sale by Holeman GM Diesel Co., Billings.

ROSEBURG, Oregon's R. A. Briggs & Sons, logger, has purchased 18 International RDF-405 trucks, powered by 300 hp Cummins NHRB-6-B engines with ten-speed main and three-speed auxiliary transmissions, and double-reduction tandem axles.

FOR the motor vessel *Tofino*, owned by the Royal Canadian Mounted Police, a GM 12009T diesel engine, 600 hp at 2500 rpm, with 2:1 hydraulic Falk reverse gear. Vessel, 65 ft. overall, had recent trial run off Vancouver, B.C.

FOR Elmer Parish's ketch *M's Santana*, based at San Pedro, Calif., a Lister-Blackstone S-L-M 2GR engine (8½ hp at 1800 rpm).

POWERING two Gradall shovels, purchased by Pasadena, Calif.'s Tyrrell-Davis (contractors) are two TD-427 Continental diesels, 114½ hp at 1800 rpm. Sale by Industrial Engine Service.

FOR the newly launched 55 ft. cruiser *Carlotta*, owned by San Carlos, Calif.'s Chaslen Corporation, two GM 8V-71s turning 29x27 props thru 2-1 Allision reduction gear.

AS auxiliary power for William A. Bartholmae's *Sea Diamond*, pleasure boat operating San Francisco bay waters, a GM 2-53 electric set, rated 15 kw. Sale by San Pedro's Anderson-O'Brien Co.

TO power a deep well pump at Calico, Calif., a Continental HD-277 diesel (68 hp at 1800 rpm), purchased by Pon Investment Co., Duarte, Calif.

SOLD: to San Pedro, Calif.'s State Fish Co. for powering lights for night bait fishing, four Lister-Blackstone SL-1 engines (4¼ hp at 1800 rpm) driving 3 kw DC generators. Sale by Bolstad Sales and Service, San Pedro.

TO Reno Equipment Corp., Reno, Nevada, to power a Gradall excavator, a TS-3 Roots-Lister, 2-cycle, pancake twin-opposed piston engine (80 hp at 1800 rpm). Sale by Failings Industrial Service, Las Vegas.

SOLD: by Long Beach, Calif.'s Equipment Service Co., a VT-12 Cummins to power an Electric Machinery 300 kw generator set—the dieselized package bound overseas.

FOR repowering a B-43 Mack gasoline tractor, a Cummins C-160 engine driving thru a Mack transmission. Sale to Dart Transportation Service, Maywood, Calif.

LOS ANGELES' Marine Transport Co. has repowered a GMC gasoline rig with Cummins' new C-160 (160 hp at 2100 rpm). Sale by Cummins Service and Sales of Los Angeles.

RETURNED to the road: by L. A. Hoobe Co., San Antonio, Texas, a C-700 Ford truck repowered with a GM 4-53, driving thru a Fuller H-72 transmission. Rear axle ratio: 5.57:1. Drive axle (by Eaton): 7.76:1.

REPOWERING an LTL Mack gasoline rig for Los Angeles' Pacific Union Metal Co. is an NH-220 Cummins working thru a Mack transmission.

INSTALLED: in a Crail Transportation Co. Kenworth tractor, replacing a gas engine, an NH-220 Cummins. The trucker operates from Long Beach, Calif.

BAKERSFIELD, Calif. hay hauler Joe Kosareff has repowered his 190 International with an NT-200 Cummins diesel.

DIESELIZING a government-operated Flexible bus is a Cummins NH-200, the installation by San Diego's E. W. Equipment Co.

Dravo Assistant to President

Mr. H. R. Mantle has been named assistant to the president, Dravo Corp. announced today. A native of Pittsburgh, Mantle is a graduate of the University of Pittsburgh with a B.S. degree in Mechanical Engineering. He joined Dravo in 1933 in the operations department, held numerous accounting and supervisory positions, became auditor in 1955 and was named assistant to the executive vice president in 1958. He is a member of the National Association of Accountants.

Rockford Clutch Brochure

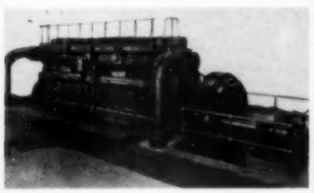
A four page brochure describing clutches, power take-offs and gear reduction units is available from the Rockford Clutch Division of Borg-Warner. The illustrated brochure describes several Rockford products for trucks, tractors, light machinery, oil rigs and other applications, gives partial specifications for some of the lines available and also lists guide questions for helping to determine the proper unit needed for specific applications. The brochure is available from the Rockford Clutch Division, Borg-Warner, 400 Catherine St., Rockford, Ill. (ITS NEW)

Editor's Note

In the first part of E. R. Sauder's article on automatic operating plants presented in the October, 1959 issue, a photograph was incorrectly identified. The control installation shown as Nantucket is actually the En-Tronic application at the Geneseo, Ill., municipal power plant.

DIESEL ENGINE GENERATOR SETS

Immediate Delivery from Inventory!



Any voltage; 50 or 60 cycle. Available in stationary, mobile or portable model. Following listing is only partial.

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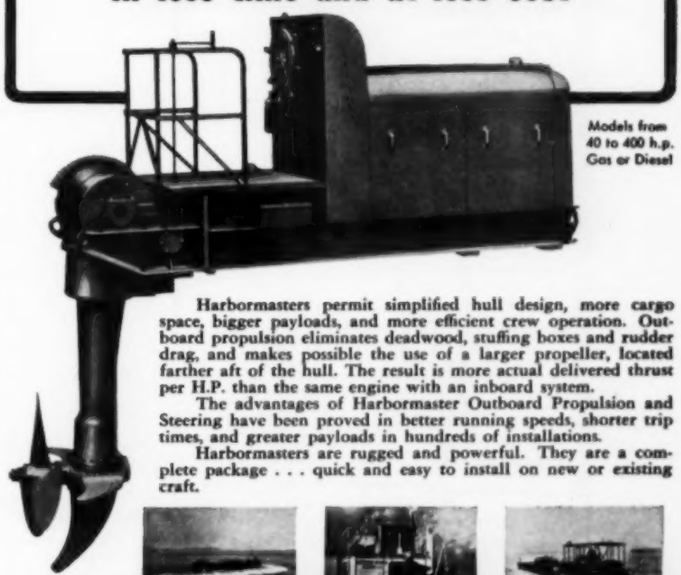
Harbormaster Outboard Propulsion and Steering Units move bigger payloads in less time and at less cost

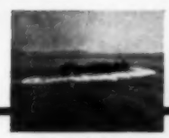


Models from 40 to 400 h.p. Gas or Diesel

Harbormasters permit simplified hull design, more cargo space, bigger payloads, and more efficient crew operation. Outboard propulsion eliminates deadwood, stuffing boxes and rudder drag, and makes possible the use of a larger propeller, located farther aft of the hull. The result is more actual delivered thrust per H.P. than the same engine with an inboard system.

The advantages of Harbormaster Outboard Propulsion and Steering have been proved in better running speeds, shorter trip times, and greater payloads in hundreds of installations.

Harbormasters are rugged and powerful. They are a complete package . . . quick and easy to install on new or existing craft.



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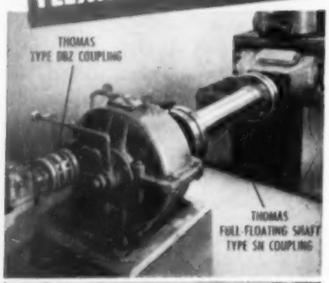

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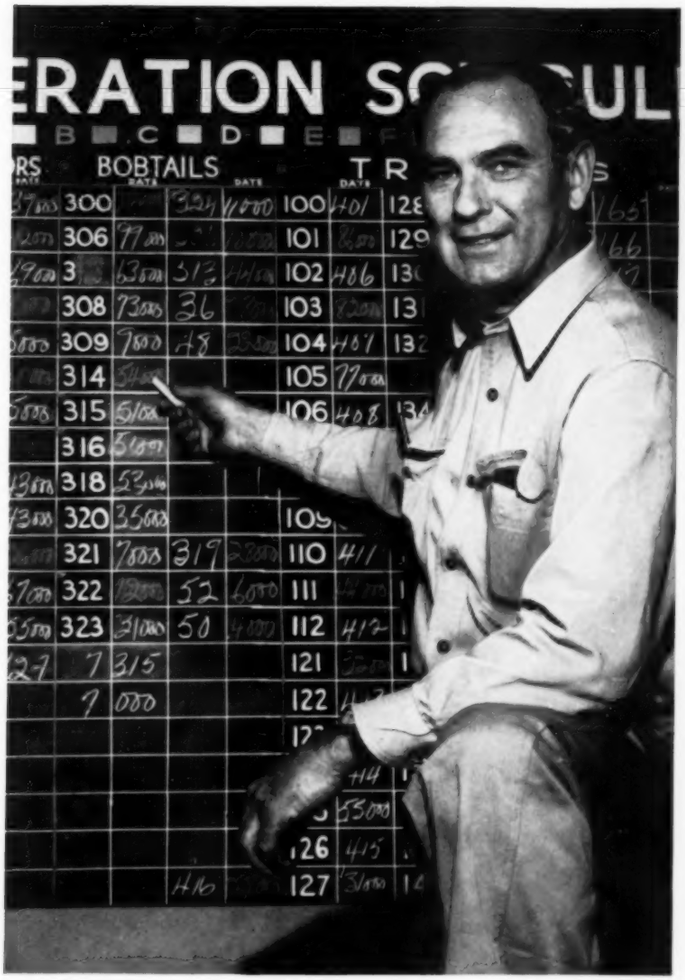
PRODUCT **RPM DELO Oil**

FIRM **STERLING TRANSIT CO.**
Montebello, California

350,000 miles on RPM DELO before rebuilding



Using RPM DELO Oil, Sterling Transit Co.'s 15 diesel tractors run an average of 250,000 miles before overhaul. "In fact, we get 350,000 to 400,000 miles out of them before engines are removed for rebuilding," reports Maintenance Manager Bill Schuster (above). "Regular oil changes are an important part of our preventive maintenance program. This color-coded chart indicates the mileage and condition of any unit in our 82-truck fleet...and these records show that RPM DELO Oil is doing a good job."

800-mile round trip between Oakland and Los Angeles is regular run for firm's big Kenworths and Internationals. Mr. Schuster makes frequent dipstick checks (above), reports make-up RPM DELO Oil for trip averages only 5 quarts. Older trucks use cleanable filters; newer units, replaceable cartridges. All use RPM DELO Oil exclusively.

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming.

For More Information or the name of your nearest distributor, write or call any of the companies listed.

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THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Donald L. Reed, *Manager Gas Engine Compressor Sales, The Cooper-Bessemer Corporation, explains . . .*

How we now make engines do 40% more work

The diagram shows a recent major development in feeding air to the power cylinders of Cooper-Bessemer's big engine-driven compressor units. This unique "*series turbocharging*" overcomes many former supercharging limitations and successfully boosts air supply for better combustion, more effective scavenging of exhaust gases, greater efficiency and increased power!

As a result, gas transmission, petroleum and chemical companies are getting 40% *more* power with these new V-angle compressor units than with predecessors of the same bore, stroke and speed. Or, for a given job, this means less fuel consumption and much lower costs for housing, foundations, piping and year-in, year-out operation.

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